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JANUARY 1953

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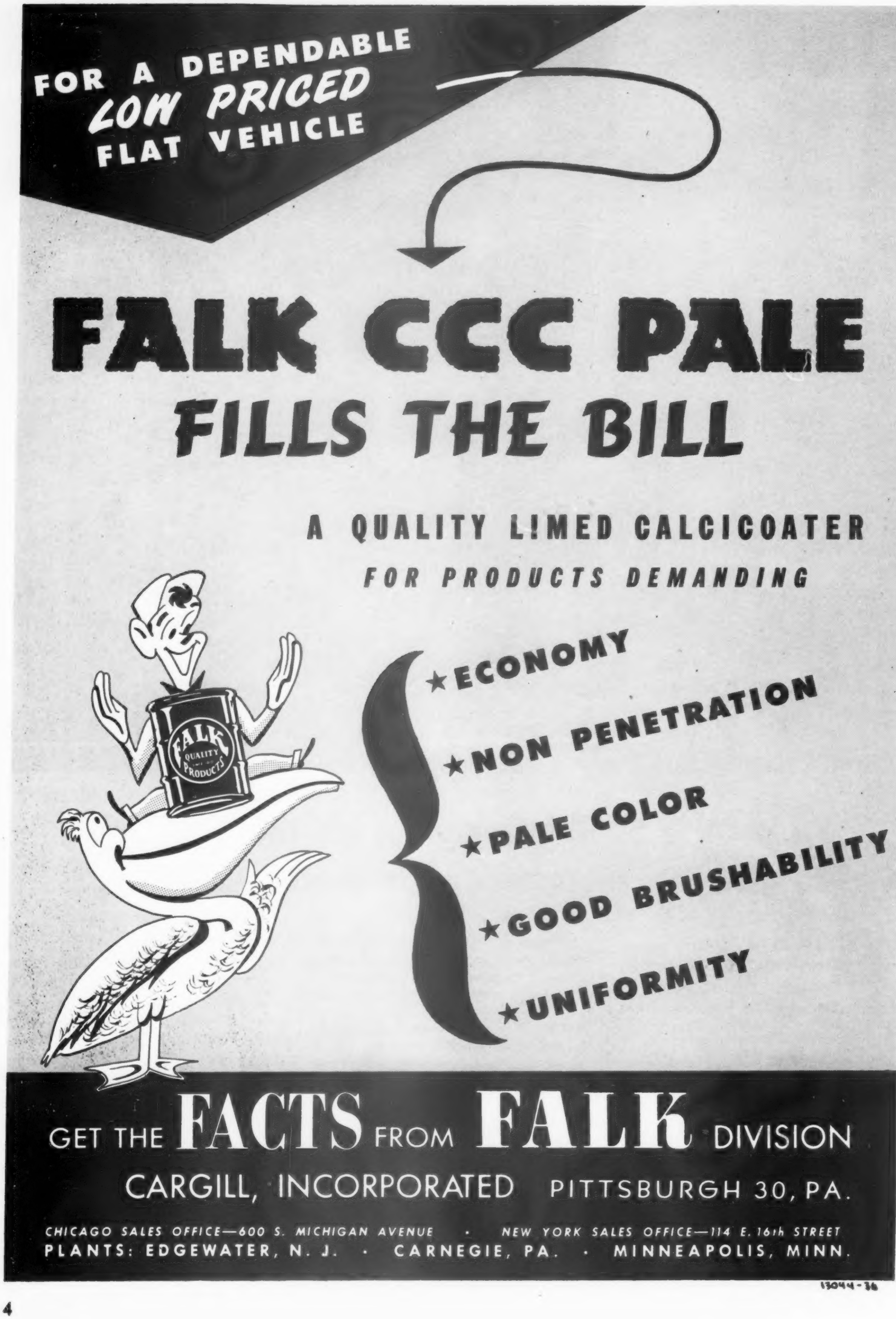

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VOL. 43 JANUARY, 1953 NO. 1

NEXT ISSUE

As you will note, this issue contains Part I of the series "Developments in the Paint Industry for 1952." Part II is scheduled for February and this will be concerned with technological developments and strides made in coating resins during the past year.

★ FEATURES

★ DEPARTMENTS

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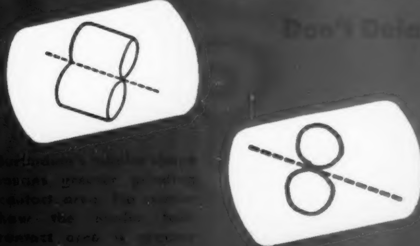

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Editorial Comment

What about 1953?

HOW does the business picture look for 1953? The experts tell us that business activity during 1953 will continue at a high level with the possibility of a slight recession occurring during the later quarter. Talk of a recession is considered healthy since many believe it will result in business men taking steps which could make it much more difficult for a recession to develop.

The consensus of opinion is that there will be no appreciable cut back in defense spending under the Eisenhower administration since the international tension is expected to remain the same, there is a possibility of stepping up the war in Korea, and talk amongst the brass in the Pentagon of a bigger aircraft program.

The outlook for construction is bright. Industrial construction is expected to dip slightly, but public construction, especially schools and highways, will be very active. The housing picture looks very strong, and in the event that rent controls are removed, there will be a stimulus for additional demands for homes from people who have been enjoying low rents.

Consumer spending is expected to increase in line with additional incomes, but in this connection, it is interesting to note that today's consumer is very "price conscious" and will not buy unless he gets a good bargain.

With respect to the paint industry, it is generally agreed that 1953 will be a good year.

Relaxation of controls should materially help firms to plan better and take a forward step in developing new products. Doubt and uncertainty of the availability of raw materials were often stumbling blocks for continued growth and expansion.

Production of consumer goods will be given more attention this year, barring, of course, the occurrence of another steel strike. A large producer of home appliances is planning to increase their 1953 production considerably over 1952, and is preparing to bring out new products which will help to take up any slack that may result from an unforeseen contraction in the defense program. Thus, manufacturers of industrial finishes should enjoy a brisk business during this new year.

In line with the prediction of high construction activity, we can expect trade sales to enjoy another good year. With interest in latex paints running high, it has been estimated that over 45 million gallons of this product will be sold during 1953. Also, the "do-it-yourself" market is expected to be a significant factor in boosting sales of all paint products.

Since the close of World War II, we have been in a seller's market. Because of shortages, most industries have been concentrating on increasing the production capacity of their plants to meet the demands for established materials. This has been particularly true of the chemical industry, and as a result of this unhealthy condition, very little was done in the way of developing new chemical materials and specialties.

However, within the last year, huge research outlays have been made to assure a flow of new chemical products and these could result in the creation of new markets, new industries, and new business firms. Continued chemical research and development will provide our paint manufacturers with new raw materials, and thus spur paint industry expansion.

A most encouraging aspect facing the paint industry during this year is the assurance of adequate supplies of raw materials. There are some difficulties, especially with paraphenylphenol resins, cobalt driers, and castor oil, but the over-all supply picture looks most favorable.

Recent figures released by the Bureau of Census show that paint sales for the month of October was close to a 120 million dollars, an increase of 9.3 percent over October 1951. Total sales for the first month of 1952 were only 1.5 percent less than for the same period a year ago. If reports of sales during November and December continue to show this high level (which is expected), 1952 will be a banner year — an indication that 1953 will be another good year for the paint industry.

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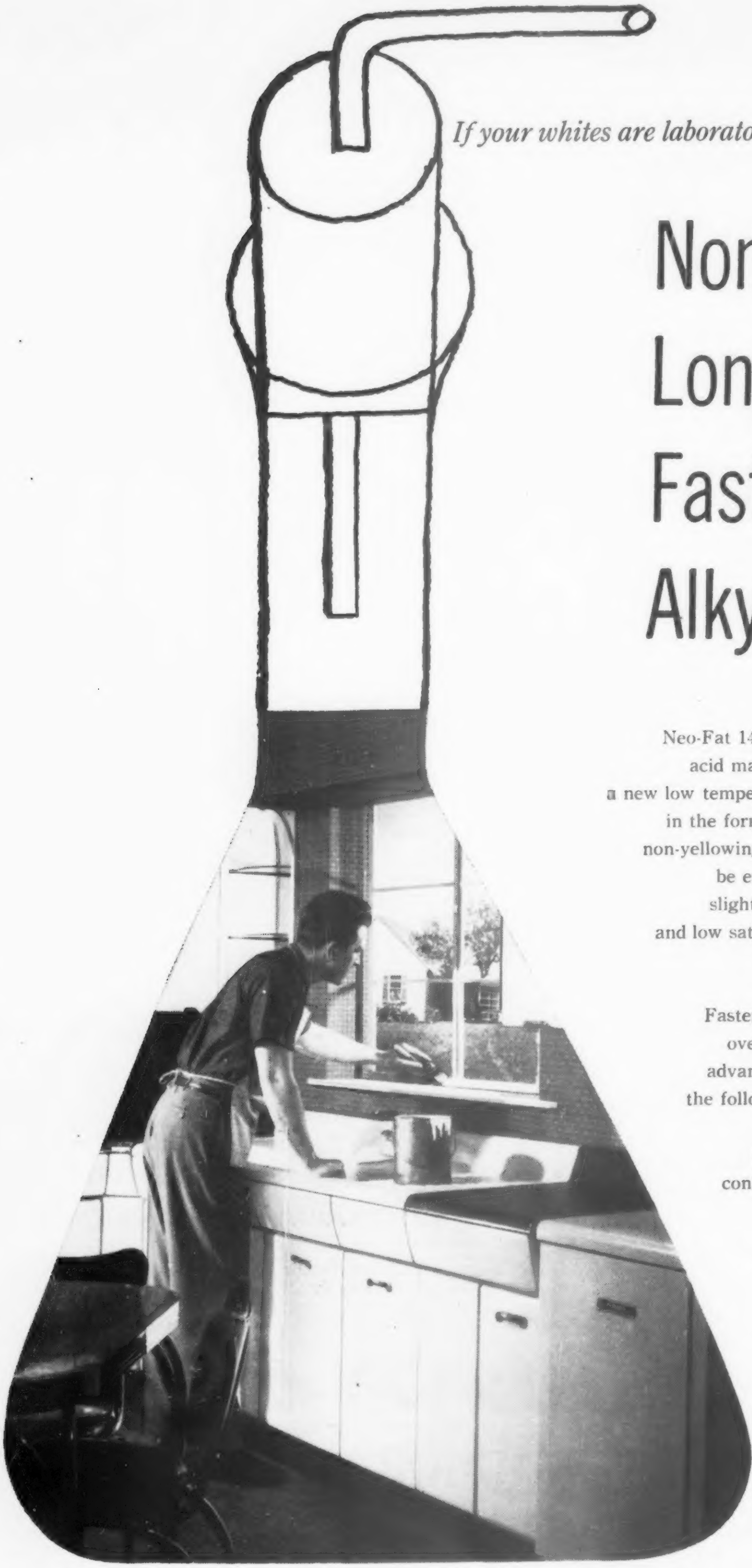


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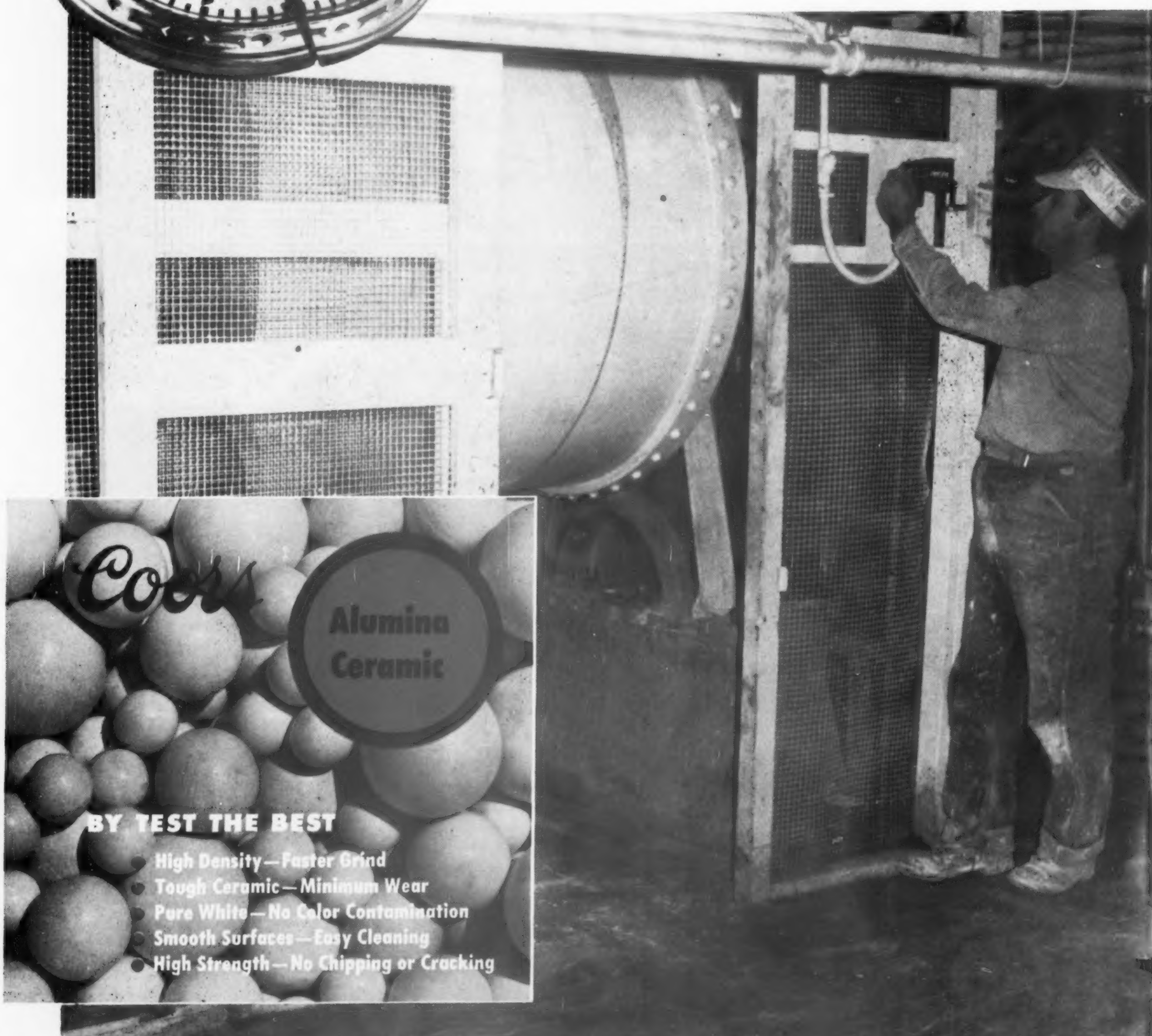

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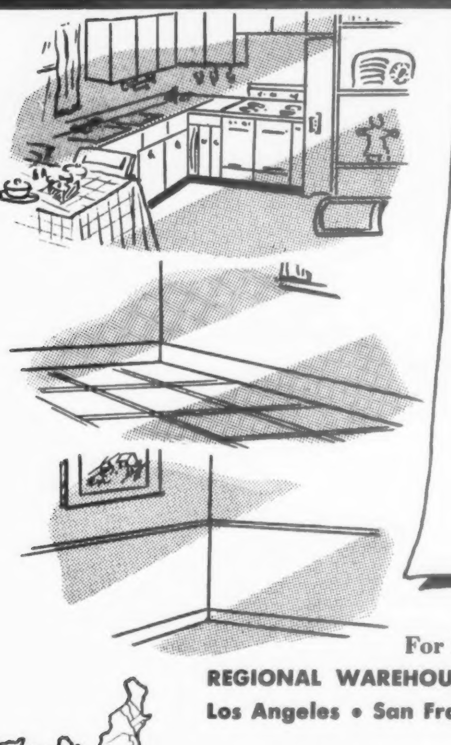

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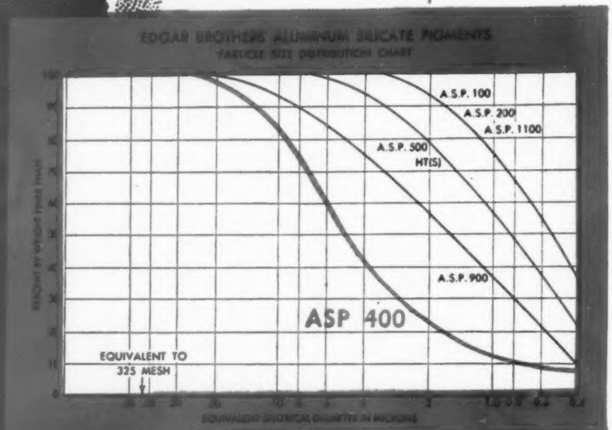

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Developments In The Paint Industry For 1952

PART I

By GEORGE S. COOK
Chemical Materials Department
General Electric Company

When technical developments, new products, new approaches, etc. are studied in the piecemeal fashion usually associated with reading the literature at time of publication, their true weight or impact is not realized, utilized or appreciated because:

1. Many of us are not necessarily interested in the data at the time of publication. When a problem does arise, we are overawed by the work involved to track down the article we saw at one time or other. As a result, we repeat work as the easiest way out.

2. We may get one idea from an article and start to work. Rarely do we go back to determine whether there isn't another potential idea or method of using the information presented in a different fashion so that we may start off again. As a result we have a low level of efficiency in building from the base structure of available information.

3. We rarely have the all-important "bird's-eye" view of the field by which we can correctly evaluate the importance of a new development, bits of information, or business trend. As a result, we frequently spend time on uneconomical developments or on incorrect approaches.

4. Commercial literature and new products are unindexed and thereby rapidly become unavailable for use. As a result, we spend time on working with our standard materials trying to make them do a job when something else is available that may do the job better, easier, and/or cheaper.

In view of these factors it was believed that an annual review of information pertinent to the coatings industry would:

1. Give perspective to developments.

2. Spotlight overlooked areas for appropriate study.

3. Furnish the man at the laboratory bench with a ready source of information.

4. Supply management with the means to evaluate their competitive position in regards a technical, business and production viewpoint.

5. Improve the rate of technical progress of the industry.

6. Improve the competitive selling ability of the salesman by enabling him to be informed of the broad picture of industrial progress.

7. Reduce the cost of technical developments because:

a. Less time would be required in searching for information or repeating work.

b. Appropriate approaches for study could be well planned out on the basis of fact.

c. All available information on materials, products, and technics would be available at the fingertips of the man with the problem.

d. Management could correctly evaluate their technical problems. (1.1.1).

It is admitted that this goal has not been achieved by the review that follows. However, it is believed that, in subsequent years, it will be possible to move closer to the goal. But, even if the optimum coverage could be achieved, the success of the undertaking would be determined only by the willingness and ability of the reader to use the material. Suggestions on how to improve this review will be appreciated. (1.1.2).

The Business Picture

Financial Statistics

2.1.1. Sales of paint, varnish, lacquer and filler for the year 1951, amounted to $1,181,009,281, a new high record for the industry, and compares with the total sales of $1,128,091,359 for the previous twelve months. Trade sales, as reported by 580 establishments which classified their sales, amounted to $616,947,488, as compared with $602, 510,936 for 1950. Industrial sales amounted to $454,193,679, of which $339,134,494 was for paint and varnish, and $115,059,185 was for lacquer. This compared with total industrial sales for 1950 of $417,458,086 ,of which $305, 529,149 was for paint and varnish, and $111,928,937 was for lacquer.

2.1.2. Table I. shows by months the total value of sales reported by 680 manufacturers, the value of sales classified by 580 establishments, and the value of the unclassified sales reported by 100 establishments. Table II shows for the years 1942 to 1950, inclusive, a summary of total sales by months for 680 establishments.

2.1.3. A new method of estimating monthly sales of paints, varnishes and lacquers has been adopted by the Bureau of Census to provide a more reliable picture of actual total sales of the industry. The statistical picture will be drawn from a scientific sampling method that is calculated to be 2-3% accurate. A new panel of companies has been selected from which the figures will be gathered. The important feature of the new method is that the end result will be a total figure for the industry as compared with the previous surveys which covered only a percentage of the industry. The data from 1929 through 1951 are based on information from 680 establishments which accounted for about 90% of total volume of the industry. Data from the 1947 Census of Manufacturers, from the 1950 Annual Survey of Manufacturing and from the Bureau of Old Age and Survivors Insurance records of new companies were used to obtain an efficient sample for use in the new system.

2.1.4. Paint Industry Reports Profits 15% Lower in 1951. The annual reports of 19 paint and varnish companies show that 1951 profits were 15% lower than in 1950. The percentage margin on sales in 1951, declined to 4.7% from 6.4% in 1950. The book net assets of the nineteen companies rose to $435,792,000 from $393,945,000. The percentage return on net assets in 1951, however, declined to 13.1% from 17.1% in 1950. Profits in the paint industry declined more than the average of 1,763 manufacturing companies, which declined 8%, while the grand total of 3,409 companies showed a drop of 7%

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in net profits. The most widespread characteristic of 1951 corporate reports was a gain in the dollar volume of sales, offset by a rise in operating costs and in taxes which caused a narrowing of the net profit margin.

2.1.5. Some idea of the price squeeze faced by many chemical processing industries was shown in figures put forth by the Nat'l. Paint, Varnish, and Lacquer Assn. Paint makers must pay higher prices for metal pigments, imported drying oils, and other raw materials, but their customers won't pay higher prices for the finished product. These price indexes tell the story:

	Nov. 1951	*Oct. 1951*	*Nov. 1950*
Prepared Paint	154.4	154.2	143.6
Paint Raw Materials	178.4	172.2	156.1

2.1.6. Paint Sales in 1952. (499) Sales, generally, for the first four months of the year were about 8-9% off from last year's comparable period. In March 1952, however, paint sellers first began to see business perk up. They point to the continuing rise in 1952's pattern of total sales (includes retail, industrial) since February compared to the erratic rise and fall in the same months of 1951.

Month	*1952*	*1951*
January	$113,400,000	$128,102,000
February	106,400,000	117,025,000
March	110,900,000	132,257,000
April	125,100,000	122,925,000
Total first 4 months	455,800,000	500,309,000

2.1.7. What Is Small Business? Congress says it's a firm employing 500 or less, but now the Department of Commerce breaks business down into categories and sets different limits on each. A paint and varnish firm is big if it employs over 100, but a pharmaceutical firm is small if it hires less than 1,000.

Expansion of Sales

2.2.1. Biggest sales improvements is in the field of the comparatively new "rubber" paints (499). According to one estimate a "good deal more than half" of the interior paint sales of major companies are latex-based paints. There were squawks from professional painters in the beginning when it looked as if these new paints were developing a nation of paint-it-yourselfers. However, it looks as if this development has improved the business of the paint contractor by stimulating interest in painting and home decorating and the professional painter has never been as busy as he is today. In 1951 some 20 million gallons of latex paints were sold.

2.2.2. Odorless Paints. But not to be outdone, manufacturers of conventional coating materials developed odorless paints. Several firms offered complete lines—flats, semi-glosses, and glosses—of the odorless sort, two more companies plan to start manufacture of the odorless solvents, and odor-free vehicles and driers were rapidly expanding in quantity. (490)

2.2.3. Aerosol Paints. Gregory (270) estimates that seven to eight million units of aerosol packaged paint products will be sold annually by 1954. A survey (492) of present sales showed 1,780,658 units of pigmented and metallic paints and 952,188 units of clear plastic sprays. Plastic "snow" is expected to be a two million plus units of sale. (468) Plastic granules (isobutyl methacrylate) are added to the can, then the solvent. Just enough solvent-propellent is added to bring the plastic into solution so that the resultant spray is not too wet and sticky. The biggest use of aerosol lacquers and enamels, at present, (470) is for touching-up major household appliances and industrial equipment.

2.2.4. Automotive Undercoaters (501). Boosting the durability of automobile bodies with plastic undercoatings has given specialties makers a $20 million annual business. In some areas, 90% of recent new car sales include the treatment. With the "knuckle test" to drive home the sound-

SALES BY 680 MANUFACTURING ESTABLISHMENTS

Year and Month	Total Sales Reported by 680 Establishments	CLASSIFIED SALES REPORTED BY 580 ESTABLISHMENTS: Trade Sales of Paint, Varnish, and Lacquer	Industrial Sales: Total	Industrial Sales: Paint and Varnish	Industrial Sales: Lacquer	Unclassified Sales Reported by 100 Establishments
1950						
January	$ 75,936,281	$ 41,203,387	$ 27,684,092	$ 20,278,601	$ 7,405,428	$ 7,048,865
February	70,873,183	37,494,707	27,145,207	19,825,145	7,317,062	6,233,269
March	87,168,993	46,847,159	32,250,376	23,528,987	8,721,389	8,071,458
April	87,605,408	48,413,477	30,934,710	22,854,970	8,079,740	8,257,221
May	103,245,857	58,259,283	35,174,778	26,552,028	8,622,750	9,811,796
June	108,817,489	61,833,157	36,708,161	27,175,202	9,532,959	10,276,171
July	99,211,623	56,848,827	33,008,318	24,555,216	8,453,102	9,354,478
August	122,629,196	69,003,691	42,160,813	30,808,891	11,351,922	11,464,692
September	103,322,879	54,753,006	38,417,050	27,564,889	10,852,161	10,152,823
October	99,383,526	49,251,726	41,114,090	29,891,381	11,222,709	9,017,710
November	87,384,371	42,024,489	37,574,571	27,146,870	10,427,710	7,785,311
December*	82,419,570	39,496,248	35,274,779	25,322,718	9,952,061	7,648,543
Total (year)	$1,128,091,359	$605,510,936	$417,458,086	$305,529,149	$111,928,937	$105,122,337
1951						
January	$ 111,117,927	$ 59,897,573	$ 41,148,679	$ 29,749,101	$ 11,399,578	$ 10,071,675
February	99,792,275	53,608,315	37,360,884	27,401,258	9,959,626	8,823,076
March	113,435,858	59,306,187	44,386,738	32,323,516	12,063,222	9,742,933
April	106,060,230	54,864,363	41,786,321	31,353,987	10,432,334	9,409,546
May	110,639,017	58,817,385	41,357,431	31,522,760	9,834,671	10,464,201
June	104,690,009	55,651,215	38,871,453	29,703,721	9,167,732	10,167,341
July	93,504,277	50,072,754	34,604,334	26,370,485	8,233,849	8,827,189
August	101,991,949	53,801,840	38,449,399	29,015,008	9,434,391	9,740,710
September	88,696,752	45,780,528	33,940,282	25,511,295	8,428,987	8,975,942
October	97,959,724	49,371,067	39,134,426	29,370,397	9,764,029	9,454,231
November	83,492,284	41,324,467	34,406,472	25,466,284	8,940,188	7,761,345
December*	69,628,979	34,451,794	28,747,260	21,346,682	7,400,578	6,429,925
Total (year)	$1,181,009,281	$616,947,488	$454,193,679	$339,134,494	$115,059,185	$109,868,114

*Preliminary

1947	1946	1945	1944	1943	1942
$ 83,788,171	$ 55,919,068	$ 53,660,343	$ 43,480,878	$ 37,843,112	$ 47,044,491
81,289,102	54,573,247	51,487,714	45,655,286	38,391,839	45,175,827
91,769,816	64,698,964	59,708,428	53,650,711	46,397,731	48,070,117
99,566,317	72,338,550	58,391,532	51,063,999	50,922,538	50,530,225
99,410,737	72,462,915	59,848,476	57,263,621	51,435,119	49,204,268
92,744,327	66,071,218	58,367,736	58,970,037	55,481,676	43,981,828
86,864,747	65,202,017	52,623,448	51,703,512	50,106,908	42,220,566
84,951,385	68,481,815	51,101,033	58,712,041	51,059,357	41,105,740
86,190,334	63,053,906	48,020,267	52,109,655	49,377,171	43,027,934
91,528,602	69,991,323	57,540,413	53,571,114	49,564,991	44,121,665
71,243,276	70,135,553	50,297,661	48,152,299	46,968,115	38,121,550
68,898,480	73,538,340	42,378,090	44,271,132	41,072,442	37,140,816
$1,038,245,294	$796,464,916	$643,425,141	$618,604,285	$568,620,999	$529,745,027

TABLE I

deadening qualities, in addition to the rust and corrosion inhibition, the national average of automobiles being treated is increasing. Generally the compounds are about one-third asphalt, one-third filler (ground cork, gilsonite, sand, asbestos fibers) and one-third solvent. They are sprayed on through large-diameter nozzles. Pressed by fire department and insurance firms, some producers have worked out water-emulsion coatings.

2.2.5. Herring (258) describes the conditions affecting paint sales in Central Florida:

1. Orlando is the distribution point for central Florida.
2. Manufacturing industries are increasing in addition to the prosperous farms and ranches.
3. Building and construction activities have increased.
4. Mildew resistant paints are of increasing interest.
5. Cement and water paints are widely used on the masonry constructed homes. Light-colored or pastel shades are still preferred.
6. The paint roller has been slow in reaching volume sales.
7. Painting and decorating of motels and motor courts are usually done at the end of the tourist season (April-May).

2.2.6. Stuart (243) and Mann (267) report a naturalistic trend in colors for homes. Deep tones are disappearing from the popular market as are grayed and muddy shades.

2.2.7. Industry is rapidly expanding production of necessary raw materials (500):

1. Maleic Anhydride. 1951 capacity, 27 million pounds; expansion, 22 million; requirements, 49 million.
2. Naphthalene. 1951 capacity, 351 million pounds; total expansion needed, 204 million; expansion yet unauthorized, 40 million; requirements, 555 million.
3. Phenol. 1951 capacity, 343.6 million pounds; expansion, 280 million; requirements, 623.6 million.
4. Phthalic Anhydride. 1951 capacity, 227.7 million pounds; expansion, 140 million; requirements 367.7 million.
5. Resorcinol. Capacity needed by Jan. 1, 1954, 10 million pounds; expansion yet unauthorized, 2 million.
6. Butadiene. 1951 capacity, 61 million pounds; expansion 101 million; requirements, 162 million.
7. Formaldehyde. 1951 capacity, 1,325 million pounds; total expansion needed, 350 million; expansion yet unauthorized, 48 million; requirements, 1,675 million.
8. Glycerine. 1951 capacity, 225 million pounds; total expansion needed, 53 million; expansion yet unauthorized, 23 million; requirements, 278 million.
9. Methanol. 1951 capacity, 174 million gallons; expansion, 52 million; requirements, 226 million.
10. Ethanol. 1951 capacity, 398 million gallons; expansion, 12 million; requirements, 410 million.
11. Styrene. 1951 capacity, 626 million pounds; expansion 584 million; requirements, 1,210 million.
12. Yellow Iron Oxide. 1951 capacity, 13,000 tons; expansion, 12,000; requirements, 25,000.
13. Titanium dioxide. 1951 capacity, 282,000 tons; total expansion needed, 88,000; expansion yet unauthorized, 27,000; requirements, 370,000.

2.2.8. Table III contains the production and sales of resins for protective coatings during the year 1951 (355).

Effective Operation

2.3.1. Industry sales managers, who sat in on the "Industrial Goods" panel of the American Marketing Association's June 1952 convention, heard some down-to-earth statements from Dick Christian (494). Christian minced no words in urging that manufacturers recognize the fact that, in a buyer's market, a company's chances of success or failure are not based entirely on

TABLE II

PAINT, VARNISH, LACQUER, AND FILLERS
SUMMARY OF TOTAL SALES OF 680 ESTABLISHMENTS, BY MONTHS, 1942—1951

Month	1951	1950	1949	1948
January	$ 111,117,927	$ 75,936,281	$ 76,960,644	$ 88,014,725
February	99,792,275	70,873,183	70,189,954	78,932,540
March	113,435,858	87,168,993	84,124,062	91,685,412
April	106,060,230	87,605,408	86,235,570	96,961,117
May	110,639,017	103,245,857	89,082,722	99,079,394
June	104,690,009	108,817,489	88,465,227	103,705,914
July	93,504,277	99,211,623	74,214,658	88,966,231
August	101,991,949	122,629,196	87,911,491	94,363,946
September	88,696,752	103,322,879	84,376,424	91,481,775
October	97,959,724	99,383,526	76,219,183	81,781,016
November	83,492,284	87,384,371	67,127,910	71,778,430
December*	69,628,979	82,419,570	57,597,705	65,874,081
Total	$1,181,009,281	$1,128,091,359	$942,505,550	$1,052,624,581

*Preliminary

TABLE III

PRODUCTION OF SALES RESINS FOR PROTECTIVE COATINGS 1951

	Production	Sales
PHENOLICS	29,754,324	23,281,175
UREA AND MELAMINE	24,944,684	18,205,271
STYRENE	46,027,409	43,253,744
VINYLS	----	21,742,621
ALKYDS		
Phthalic Anhydride Types		
Unmodified	234,623,024	113,875,052
Modified with tar acids, rosins, etc.	90,219,498	72,745,591
Polybasic Acid Types (except Phthalic)		
Unmodified	7,905,111	5,291,072
Modified	94,111,248	37,919,997
Rosin Modifications		
Rosin and Rosin Esters (Unmodified)		
Esterified with glycerine	17,680,777	17,187,477
Esterified with other alcohols	20,460,823	13,328,153
Rosin and Rosin Esters (modified)		
Phenolic and other Tar Acids	20,008,700	18,870,671
Malic and Fumaric Acids	30,310,118	27,715,495
OTHERS		
Epichlorhydrin, Acrylic, Polyester, Silicone, etc.	19,156,981	21.162,828

Table III. Production is given in pounds; sales in dollar volume.

absolute values of wisdom or judgment. Just as important is the relative position of the company with respect to its competitors in the market place. In order to measure these relative values, it is essential that deliberate studies of competitive companies be made. To maintain such a dossier on each competitor, these checklist items are suggested:

1. Complete financial information, including both past income history and current financial condition.
2. Location, size and capacity of all plants and subsidiaries, with a study of resulting marketing areas.
3. Product information, accenting new developments and uses. This includes data on research efforts.
4. Personnel history, size of work force, and interpretation of top-management shifts.
5. Distribution and sales organization — number of salesmen and type of territory coverage.
6. Pricing methods and policies, especially the percentages used on discounts and allowances.
7. Advertising and promotion activities; percentage of sales dollar spent and media used.
8. Production methods and facilities, with an analysis of obsolescence, maximum rate of production, and current delivery position.
9. Customer relationships, number, size, key accounts, and known reciprocal ties.

2.3.2. Standard Factors Corp. (498) polled its clients to determine how they tackled the critical task of incorporating new ideas and materials into their manufacturing operations. Of the 726 sampled firms, the great bulk had virtually no planned procedure for the regular evaluation of alternate raw materials. Most of the fore-planning fell in the category of the company president's calling up his research director and saying, "We're out of zinc today, find me something else we can use tomorrow!" Only 3.3% of the companies reported any system for the digesting of incoming information, either from salesmen or from literature. In fact, only 13.4% of the total admitted they received any help at all from outside sources on developments in their fields. These credit their trade associations, suppliers, trade journals, and outside research laboratories as being their main providers of new product tips. It was noted that companies that neglected new-product opportunities, tended to fall behind their fellows. Either they were hit extra hard when shortages occurred or else they failed to bring out competitively equal products when the selling race stiffened.

2.3.3. Vaughn (481) considers his California Colors a practical demonstration of the laboratory solving a sales problem. The bases of California Colors, of which there are six for different uses, are clear and colorless. They are packaged in quarts and gallons, but the containers are only three-quarters full to accommodate the pre-measured pigment packages which are added at the time of sale. From 14 different special pigments, the dealer can make up any of 216 colors in any of six different paints without measuring anything. A year later, the purchaser can be sure of getting the same subtle shade or tint.

2.3.4. Go To The Customer (491). Instead of making its products in one big factory, shipping all over the country, Reichhold Chemicals, Inc. makes it in a lot of little factories, ships short distances only. Freight savings are a big factor in the system's favor as are savings in package costs, since very little RCI material has to be packaged for the short distances it travels by truck. Estimated freight and package costs normally run 15 to 20% of costs whereas this method cuts them to 3-5%. Use of local raw material again saves in transportation costs, insures steady, ready supply, and builds local goodwill for the company.

2.3.5. Pennsylvania Salt Manufacturing Co. (471) has a new container control system that enables it to establish, at any time, the location of some 40,000 returnable containers. The system has reduced customer complaints, increased container turnover, reduced container costs, reduced shipping delays, decreased work load in central accounting section. The system is based on mechanically-handled punc cards assembled in various files from which periodic reports are compiled.

2.3.6. Smith (216) claims that business costs fall into three broad categories: The cost to make (materials, labor, etc); The cost to be (amoritization, taxes, management); and the cost to sell. The cost to sell may be reduced in terms of volume when consideration is given to:

1. The market. Where is it? Who is it? How big is it? How is it changing? Why?
2. The product. How well, against competition, does it satisfy the wants and needs of the user? Is it properly packaged? Is it priced right? Is it available in sizes and quantities the user wants?
3. The Marketing Effort. Is the sales force effective? Are the men adequate for the sales job? Are they properly trained? Do they know the product and its uses? Do they know how to sell it? Are they well directed? Supervised? Kept alert? Are they paid under a plan that provides a forceful incentive? Are they supported by effective sales promotion?

2.3.7. Zucker (257) states that the painting and decorating contractor of today is an expert who is building his craft and profession. He is, in many cases, the first point of contact with the public. The paint dealer can do both the consumer and painting contractor a great service by bringing them together with the right material.

2.3.8. Smiles (172) outlines the desired personnel relations for effective operation. He finds that workers, in general, are individualists, optimists, proud and intelligent. They are motivated by desires for security, opportunity, recognition, job satisfaction, pride in company and boss, and courteous supervision. Modern management lies in understanding people. Management shares an equal responsibility to stockholders and employees. It is management's responsibility to select, train, and perpetuate a happy, loyal and cooperative employee group. Executives must remember that they are working with people; that they have to influence the action of others; and that effective human leadership is contagious. Effective leaders exhibit tolerance, humility and sympathy as a matter of instinct: they identify themselves as people first, business managers second.

2.3.8. Woodruff reviews the factors that govern research and development in the coatings materials industry. Factual information (193) is described; how to build information about markets, conditions, demands, etc; what should be done with information; how it should be tested for reliability and completeness; and how it can be used effectively. A general scheme of approach (196) to a research problem consists of:

1. Selection of a limited field for investigation.
2. Segregation, isolation, measurement, and description of the parts of the substance involved.
3. Determination of the functions of each part.
4. Determination of the effects that result in the substance when one part is varied (determine cause-effect relationship).
5. Showing what effect result in the substance when a second part is varied.
6. Predicting an effect that will occur when still another part is varied.
7. Checking the prediction experimentally.
8. Continuing the determination and prediction of cause-effect relationships.
9. Correlating the cause-effect data into a pattern so that any substance or any question regarding it can be answered in terms of cause-effect relationship.

2.3.9. Woodruff (198) states that developments need a central purpose to give impulse into the market and general application to keep them in the market. A check list to aid in selection of the right job to work on is given in Table IV. Four case histories (207) are cited to exemplify the development technics for varnish and vehicle formulation consisting of:

1. Improving an existing manufacturing process.

2. Use of alternate or new raw materials.

New types of varnishes and vehicles have a possibility of satisfying new requirements or satisfying the old requirements in an entirely new way. New needs can be recognized from: the sales department; or from examination of the structure of the user's business.

2.3.10. Three methods for continuous production of vehicles are described by Woodruff (213) and the pros and cons of batch versus continuous production are as follows:

1. Batch Production:
   a. Suitable for small or large equipment.
   b. Equipment is comparatively low in cost.
   c. Dollar labor costs are high in relation to volume produced.
   d. Control consists of following the progress of the batch.
   e. Batches vary.
   f. Slow-up-heat and slow cooling limit range of products that can be made and efficiency of set-up.
2. Continuous Production:
   a. Higher yields from raw materials.
   b. Improved performance characteristics.
   c. Low labor costs in relation to volume.
   d. Better control over characteristics of product.
   e. Long runs of a single material are necessary.
   f. High initial cost requirement.
   g. Careful standardization of starting materials is necessary.

2.3.11. Woodruff (215) explains that the paint formulator's job is to deliver

A COMMERCIAL SITUATION

Name of Product Considered:

REQUIREMENTS TO BE MET IF PROJECT IS TO BE ACCOMPLISHED

Expenditures

Time — Research
Men — Development- Laboratory
Equipment — - Pilot Plant
- Sales Development

Relation of Requirements to actual ability to meet them

CONTINGENCIES TO BE CONSIDERED AND SATISFIED IF PROJECT IS TO BE DONE

Suitable Raw Material Supply Availability

Product line with Industry Trend

Comparison to Competetive Products — favorable unfavorable

Market and Customer Requirements — stability, long term, actual or stated, current requirements.

Actual importance of product in question to the carrying on of customer's business

Attendant circumstances such as government regulation, foreign conditions, plant locations, shipping conditions

RESULTS ANTICIPATED ON COMPLETION OF PROJECT

Direct results — Expected selling price — Expected Volume

% of Market taken

Advantages — Temporary — permanent — patent — by products

Specific sales-objective

Position as part of the Development Campaign

TABLE IV — SECTION I

A TECHNICAL SITUATION

Name of product considered:

THE NEED

What the Customer (and market) actually desires

properties   price   volume

Reasons why the present product is not completely satisfactory

What special modifications of existing process the customer will make

How the customer will know he has what he desires

customers tests;   end users tests;   time involved;

How we will know the customer has what he desires

ATTEMPTS TO SUPPLY NEED

Other products the customer could use   reasons for not using

Attempts to improve currently used products   results

Why haven't other suppliers supplied the customers need

Why the customer doesn't develop the required product himself

OUR ADVANTAGE

What special product could we supply that would be more satisfactory than the product now in use

How the new product would circumvent the disadvantages of the product now in use

Special sales effort or special equipment required

Would the new product be in the direction of our expansion trend

TABLE IV — SECTION II

good, inexpensive formulations fast. This must be done with due consideration to: How marketing affect formulation problems; How the paint formulator approaches his problem; The status of paint research; What and how test procedures are used; and specialization of product of manufacture. Development technics as guides for action in determining product diversification, establishing a product line, setting up controls, effective instrumentation and assuring cost reduction is discussed (224). Methods of developing new raw materials and how they could be marketed for the coatings industry is reviewed (228).

Legal

2.4.1. Naval stores producers are seeking a daily pricing system to replace outlawed Savannah exchange. The Government action closing the exchange was at the behest of the turpentine and rosin farmers, who complained that prices were not representative of actual market conditions. The U. S. Department of Agriculture has instituted a market reporting system giving the range of prices obtained by both gum and wood processors on their sales, but the industry feels that this is not a satisfactory price since the information is voluntary. (489)

2.4.2. The Glidden Co. and Du Pont were acquitted of violating the Sherman Anti-Trust Act by a Federal Court. The companies, along with 15 other paint manufacturers and numerous individuals, had been accused by the Justice Dept. in an action filed in 1948. on the charge that since 1937 they had been part of a conspiracy and combination to control prices, discounts, allowances and terms of sale of paint.

2.4.3. New Wrinkle, Inc. has filed a suit in U. S. District Court asking for $500,000 in damages for libel and slander and asking for damages for loss of royalties and for alleged violation of anti-trust laws against the Interchemical Corp. The Government's anti-trust suit against New Wrinkle, Inc. and the Kay & Ess Co. has been reinstated by the Supreme Court of Ohio. The Supreme Court held, "An arrangement was made between patent holders to pool their patents and fix prices on the products for themselves and their licensees. The purpose and results plainly violate the Sherman Act." (484)

Wurdack Chemical Co., St. Louis has filed a patent infringement suit against Ranetite Mfg. Co. and Dow Corning Corp. The suit revolves about the use of silicones in making masonry water-repellent. Dow Corning has sold silicones to both Wurdack and Ranetite, as well as about 45 others. To certain of the buyers, DC gave a patent indemnity guarantee, believing that the patent is invalid, and that it hasn't been infringing. DC will conduct the defense in the suit. (495)

Business Changes

2.5.1. HARDESTY Opens Fatty Acid Plant in Canada. The first plant in Canada for the production of hydrogenated fatty acids and glycerides in the inedible field has been completed at New Toronto, Ont. — a one million dollar enterprise by W. C. Hardesty Co. The new hydrogenation equipment includes all the latest improvements and is designed to be operated completely by one man. The progress of the entire reaction is automatically recorded on a centrally located control panel from which all process variables may be controlled.

2.5.2. AMERICAN CYANAMID to Produce Chemicals from Natural Gas. A new plant will be built near New Orleans, La. for the production of ammonia, acetylene, hydrocyanic acid and derivatives of these products from natural gas. The plant will represent an investment of about 50 million dollars. New Still Doubles NUODEX Production of Naphthenic. The new stainless steel vacuum still, placed in operation in the Elizabeth plant of Nuodex Products Co., Inc. will more than double the companys production rate of distilled naphthenic and other organic acids. The new still improves the purity and uniformity of acids refined by removing contamination and minimizing color and odor. Also, in times of tight supply of some raw acids it permits the use of more available acids, yet produces a refined product of excellent quality. ADM Expansion. A refinery and Bodying plant at Los Angeles will produce bodied oils, chemically modified oils and products now being manufactured by the Progressive Varnish Division of Archer-Daniels. A solvent extraction plant being constructed in Buffalo is expected to increase the firm's production of linseed oil and linseed oil meal by 50% at this plant.

2.5.3. HEYDEN Begins Production of Resorcinol at Garfield at the rate of 600,000 lbs. a year. Resorcinol, an essential ingredient in waterproof glue and adhesives for wood, in resins for rubber and tire cord sizing and many other products, is one of the few chemicals still on allocation by NPA. KOPPERS CO. and Heyden are the only producers at this time. HEYDEN and SHAWINIGAN to Pro-

duce Basic Paint Materials. Heyden Chemical Corp. and Shawinigan Chemicals Ltd. have formed a new Canadian company which will initially manufacture 30 million pounds of formaldehyde and 3 million pounds of pentaerythritol. TENNESSEE EASTMAN Produces Chemicals in Texas. N-butyraldehyde for sale as the aldehyde, conversion to alcohol and acid, and conversion to 2-ethyl hexyl alcohol; isobutyraldehyde will be sold, converted to the alcohol, acetate and ethyl alcohol. Tall Oil Distillation Unit for WEST VIRGINIA PULP AND PAPER CO. A new tall oil deodorizing unit incorporating improved design features to give a higher quality product has been successfully put in operation. HERCULES POWDER CO. Plans New Hydrocarbon Chemicals Plant to produce phenol, para-cresol, acetone, and cymene alcohols will be built near Gibbstown, N. J. for eight million dollars.

2.5.4. REICHHOLD CHEMICALS INC. received a certificate providing $1,475,000 for expansion of phenol plant in Tuscaloosa, Ala. from DPA. Reichhold to Manufacture Resin Line in Israel. A complete line of synthetic resins for the paint, paper, printing ink and plywood industries will be manufactured in Israel. Financial and operational control will remain in Israel. Reichhold engineers will impart the necessary American know-how to engineers there. A complete line of synthetic resins will also be manufactured in Brazil by Resana S. A. Industries, Quimicas, Sao Paula. A new technical service laboratory and offices for management, sales and office personnel has been opened by Reichhold at the company's Midwest Division (Argo) plant located at 7738 W. 61st Pl., Summit, Ill. A new South Atlantic Division to join the field of cellulose chemistry to its activities in the coal tar and petroleum chemistry field has been established by Reichhold. Jacksonville was selected as the site for the new division because it is also a naval stores center, making it a convenient spot at which to carry out research into terpene derivatives.

2.5.5. NAUGATUCK DIVISION of U. S. Rubber complete a latex and plastic materials plant to house sales, laboratories, and manufacturing and warehousing in Los Angeles. DOW CHEMICAL expands its West Coat polymer facilities at Pittsburg, Cal. to produce styrene latex and to build a 3 million dollar plant at Torrance for polystyrene. BORDEN'S Chemical Division will produce 1.5 million pounds of formaldehyde and liquid ammonia at Demopolis, Ala. EMERY INDUSTRIES adds 2 million dollar plant expansion to its Cincinnati fat-splitting facilities. THE MERRIMAC DIVISION of Monsanto Chemical Co. has expanded facilities for the production of Resloom HPS, a dry powder melamine resin for developing permanent embossed effects on cotton fabrics. ACHESON INDUSTRIES, INC. is expanding its activities in pigment dispersions with the acquisition of two Philadelphia firms, Peerless Printing Ink Co. and Synthetic Lacquer & Varnish Co. SPENCER KELLOGG has allocated one million for its expansion into cottonseed oil processing in California. COLTON CHEMICAL CO. is expanding production of polyvinyl alcohol from 10,000 to 50,000 pounds per month. DEWEY AND ALMY CHEMICAL CO. has gone into production of high styrene copolymer latices and is developing a paint latex said to offer superior water and scrub resistance. GULF NAVAL STORES is constructing a 1.8 million dollar plant at Andalusia, Ala. to extract naval stores

TABLE V GOVERNMENT NEEDS

JAN-L-73	12,800 gal.
JAN-L-118	750 gal.
JAN-P-735	36,000 gal.
TT-B-51A	28,000 gal.
TT-E-489	50,000 gal.
TT-E-506B	6,100 gal.
TT-L-58	836 gal.
TT-P-34	24 gal.
TT-P-58	150 gal.
TT-P-91	470 gal.
TT-P-381	885 gal.
TT-P-791a	16,000 lbs.
TT-P-59	97 gal.
TT-P-102	54,000 gal.
TT-P-633	120 gal.
TT-P-115	500 gal.
TT-R-191	180,000 lbs.
TT-R-266	12,480,000 lbs.
TTT-801	30,000 gal.
TT-V-91B	7,450 gal.
TT-W-261	2,400 lbs.
TT-Z-415	648,000 lbs.
MIL-R-15184	250,731 lbs.
Enamel, part	1,000 gal.
Enamel, Semi-Gloss	43,200 gal.
Enamel, Synthetic Gloss	38,385 gal.
Enamel, Exterior	3,034 gal.
Paint, Aluminum, Ready-Mixed	20,610 gal.
Paint, Concrete floors	1,976 gal.
Paint, Drier	200 gal.
Paint, Primer-Sealer	650 gal.
Paint, Red Lead	600 gal.
Paint, Remover	299,505 gal.
Turpentine	1,265 gal.
Varnish, Electrical, Insulation	2,500 gal.
Xylol	35,600 gal.

from pine stumps. PITTSBURGH COKE & CHEMICAL will expand plasticizer production consisting of phthalates, sebacates, adipates and tetrahydrofurfuryl alcohol oleate. STANDARD OF CALIFORNIA will build first synthetic phenol plant on the West Coast. Output of the 4 million dollar plant will be marketed by Oronite Chemical Co.

2.5.6. SHELL CHEMICAL builds sulfur recovery plant at its Houston plant to recover sulfur from waste refinery gases. CELANESE plans new laboratory in Texas to study production of chemicals from petroleum raw materials. OIL & CHEMICAL PRODUCTS, INC. expands production of solvents from coal-tar derivatives, including toluol and aromatic aviation gasoline. NATIONAL STARCH expands production of vinyl polymers in a 2 million dollar 3 year program to double their present capacity for producing vinyl acetate polymers and copolymers. In addition a new research building to provide additional facilities will be built. UNITED LACQUER to triple research facilities. An important objective will be to originate new materials for government agencies particularly for defense projects. Special development projects also will be instituted in behalf of the textile, printing, laminating and plastics industries. Work in behalf of the building, electrical, furniture and wood products industries will be continued.

2.5.7. Construction starts on BORDEN'S new Philadelphia laboratory — a one-story building with a floor space of 11,000 sq. ft. Research emphasis will be on development of new technics and chemical products such as synthetic resins, coatings and binders. NATIONAL GYPSUM CO. acquires WESCO WATER-PAINTS, Inc. including plants, working capital and good will. This acquisition will round out National Gypsum's paint

TABLE VI-GOVERNMENT PURCHASES

TYPE	AMOUNT	DOLLAR VOLUME	FIRM
Enamel	2,800 gal.	25,262	Midland Ind. Fin.
"	50,875	54,436	20th Century Paint & Varn. Corp.
"	91,350	124,656	Pacific Paint & Varnish Co.
"	150,725	189,155	Wm. Armstrong Smith Co.
"	20,300 gal.	33,132	Hub Paint & Var. Co.
"	7,500	15,375	Cowan-Campbell Paint Co.
Paint	Various	41,952	Hub Paint & Var. Co.
"	15,500	31,620	Pervo Paint Co.
Paint	10,500	25,620	Superior Paint & Lacquer
"	23,100 gal.	64,147	Wm. Armstrong Smith Co.
"	165,000 gal.	33,333	Pacific Paint & Var. Corp.
Paint Remover	62,400 gal.	97,096	Starco Chem. Co.
Pigment	660,000	153,600	Titanium Pig. Corp.
"	288,000 lbs.	115,200	W. C. Laughlin & Co.
Pigment Copper	648,000 lbs.	212,980	Metals Disintegrating Co.
Pigment Zinc Oxide	540,000 lbs.	99,414	N. J. Zinc Sales Co.
Paint	1,341	16,092	Pervo Paint Co.
Resin, Para Phenyl	250,000 lbs.	164,900	Reichhold Chem. Inc.
Rosin	1,800,000 lbs.	767,400	Taylor Lowenstein & Co.
Sealer Paint	various	34,356	Pacific Paint & Var. Co.
Thinner	57,420 gal.	43,952	A. H. Thompson Co.
"	37,730 gal.	29,158	Coast Paint & Lacquer Co., Inc.
Turpentine	35,000 gal.	29,866	Crosby Chem. Inc.
Thinner	50,000	47,700	Nycel Inc.
"	50,000	56,800	Enmar Inc.
"	24,000	34,050	George Senn, Inc.
"	25,000	25,090	Paint Specialties, Inc.

Effect of Alcoholysis Catalysts At Reaction Temperatures of 440°-450° F.

Catalyst	Conc'n. % (Based on PE + oil)	Time (Hrs.) To Achieve Complete Alcoholysis	Gardner Color At Completion of Alcoholysis[1]	Gardner Color 30 Min. After Completion of Alcoholysis[1]	Gardner Color 60 Min. After Completion of Alcoholysis[1]	Comment
None		4.58	6¼	......	6½	
PbO	0.01	0.58	5¾	6½	7½	Resin solutions are easily filtered; clear, stable solutions result.
	0.025	0.42	6½	8½	10	
	0.05	0.25	6½	8½	10½	
	0.10	0.25	8¼	9½	11	
CaO	0.01	1.17	6¼	6¼	6¼	Resin solutions are difficult to filter; clear, stable solutions result.
	0.025	1.00	5¼	5½	5¾	
	0.05	0.75	5¼	6¼	6½	
	0.10	0.92[2]	5½	6½	6¾	
LiOH	0.01	1.67	5½	5½	6	
	0.025	0.58	6¼	6¼	6¼	
	0.05	0.50	6½	6½	6½	
	0.10	0.33	6½	6½	6½	
Li_2CO_3	0.01	2.33	5½	5½	5½	Filtered resin solutions become cloudy on standing.
	0.025	1.67	5¼	5¼	5½-5¾	
	0.05	0.92	6¼-6½	6¼-6½	6¼-6½	
	0.10	1.00[2]	6¼	6¼	6¼	
Co naphthenate (6% metal)	0.01	5.92	6½	6½	6½	
	0.025	>6.5[3]	....	....	....	
	0.05	>6.5[3]	....	....	....	
NaOH	0.05	1.33	6¼-6½	6¼-6½	6½	Filtered resin solutions become cloudy on standing.
	0.10	0.50	6½	6½	6½	
Sulfur	0.05	2.50	6¼	6¼	6¼	
Ca octoate (5% metal)	0.01[4]	0.67	6	6	5¾	
	0.05[4]	0.42	6¾	6¾	7¼-7½	

1—Colors determined while batch was still hot (400°-450° F.).
2—Value not certain because haze due to excess catalyst apparently obscured results of alcoholysis test.
3—Apparently cobalt naphthenate acts as an alcoholysis inhibitor.
4—Per cent of catalyst shown is calculated on calcium basis.

Table VII

line by adding Wesco's line of water-thinned paste paints, dry powders, exterior masonry paints and interior rubber base paints. AULA CHEMICAL acquires H. V. WALKER CO. Both the Aula line of textile colors and the Walker line of industrial finishes are to be manufactured by Aula. AMERICAN-MARIETTA CO. has acquired control of O-Cedar Corp. through a stock exchange. FERRO CORP. directors approved purchase of full control of WEL-MET CO. of Kent, Ohio. PITTSBURGH PLATE GLASS'S subsidiary, Canadian Pittsburgh Industries, has acquired all the assets and facilities of MURPHY PAINT, LTD. and HOBBS GLASS, thus consolidating PPG's Canadian operations. ACHESON INDUSTRIES, INC. acquires PEERLESS PRINTING INK CO. and the SYNTHETIC LACQUER AND VARNISH CO. to permit expansion of activities in pigment dispersions. D L PAINT & WALLPAPER CO., Dallas, Tex. merged with the HANNA PAINT MFG. CO., Columbus, Ohio. DL and its subsidiary Texline Paint Mfg. Co. will make Hanna paints, continue manufacture of its present line of D L products, and market both in the southwest.

2.5.8. BENSING BROS. & DEENEY open half million dollar printing ink plant. SCHENECTADY VARNISH CO. builds new plant at Rotterdam, N. Y. to make alkyds, maleics, phenolics, terpenes, and industrial varnishes. PLY-ON COATINGS, INC. has been formed in San Francisco to manufacture and distribute plastic coatings and protective supplies. The SCHOLLE CHEMICAL CO. leased 20,000 sq. ft. of plant space in Maynard, Mass. to produce paints and varnishes. BLAKE PAINT CORP. opens factory in Orlando, Florida to supply industrial finishes based on lacquers, paints, synthetic enamels, thinners and vinyl coatings to manufacturers of wood, metal and plastic products. The CORONET PAINT MFG. CORP., Brooklyn, N. Y. established a full line of interior and exterior white paints. MONROE SANDER CORP., Long Island City, to manufacture hot spray lacquers in colors as well as clear.

2.5.9. BARRETT DIVISION of Allied Chemical & Dye Corp. opens an applications research laboratory at Edgewater, N. J. to test materials and processes used in the manufacture of plastics, rubber products, paints, varnishes, paper, laminates, insulating materials, etc. RAYBO CHEMICAL CO. established its research and development laboratory at Huntington, W. Va., where the firm's production is carried on.

2.5.10. SUPERIOR MATERIALS, INC. has formed a Superior Lecithin Division to handle the marketing of soya lecithin. SPARKLER MANUFACTURING CO. opens West Coast Branch in Los Angeles. AMERICAN MINERAL SPIRITS CO. creates a Mid-South Territory by opening an office in Jackson, Miss. MOREHOUSE INDUSTRIES appoints Pacific Coast Chemicals Co. of San Francisco as exclusive Northern Calif. agent. GODFREY L. CABOT INC. names Henry L. Grund Co. Cleveland as agent for sale of Cabot carbon black in Cleveland and northern Ohio. BAKER CASTOR OIL CO. appoints Thompson-Hayward Chemical Co. of Minneapolis as sales agents. ARCHER-DANIELS-MIDLAND opens office in Cincinnati. ALKYDOL names Morton-Meyers representatives for mid-west area. VIOLITE PIGMENTS appoints Filo Color as agent on the Violite Phosphorescent and Flourescent Pigments. METALS DISINTEGRATING CO. appoints R. T. Hopkins of Atlanta, Ga., Charles L. Burk Co., and Truesdale Co. as distributors. BRAZIL OITICICA INC. names Thomas B. Carpenter Co., Los Angeles as distributor. RAYBO CHEMICAL CO. Appoints Jameson Chemical Co. as agent. SHELL CHEMICAL CO. opens sales office in Atlanta.

The Government Picture

3.1.1. Although purchases of paint, both direct government purchase as well as purchases by prime contractors, at times, hit volume peaks reminiscent of the hectic days of World War II, the paint industry, in general, took it in its stride. With more and more raw materials becoming easier to get, the clamour for DO's subsided.

3.1.2. A listing of the various requests for bids is given in Table V. Table VI contains a summary of various awards made during the year. The information was obtained by abstracting the information supplied by *Chemical Week*. For various reasons, the information presented is by no means complete but is offered as a partial guide as to the type of direct paint purchases by the Government.

3.1.3. The National Paint, Varnish and Lacquer Association advised its members to be particularly careful about meeting color matching requirement on Federal purchases. The Association suggested that paint manufactures:

1. Secure a color chip from the Government agency and match his paint to that color.
2. If no color chip is obtainable, obtain a written statement from the Procurement Office that the paint shall match a color specified in Federal Color Card, TT-C-595.
3. In every case, secure a color chip or letter of authorization before furnishing any paint on a Government contract.

3.1.4. At a meeting of the Paint Industry Technical Committee the possibility of preparing emergency Government paint specification was discussed in respect that potential shortages could require conservation of materials used in the manufacture of paints. A representative of the General Services Administration reported that specifications for certain tung oil and phenolic resin varnishes and floor sealer coatings might be modified to reduce or eliminate the amounts of these ingredients without affecting the covering qualities of the coatings for some uses.

3.2.1. Ruggeri (192) presents a breakdown of Government specifications that require fungicidal treatment and covers vehicle requirements for the fungicide, type of fungicide, and method of test. Witco Chemicals Co. issued a revised and expanded technical service report covering mildew proofing agents with respect to government specifications.

3.2.2. The American Cyanamid Co. published technical data sheets illustrating the use of its resins for certain federal and military specifications. The Hercules Powder Co. made a handy guide to specification lacquers for finishing military items available. The first section enables suppliers of finishes to find out what kind of lacquer is being called for when all they have is a specification number. The second section groups appropriate specifications by use.

3.3.1. The Corps of Engineers (218) is studying: corrosion inhibiting primers by evaluating various chromate type pigments; fire retardant paints for combustible surfaces; maintenance painting of cantonement buildings; pipe line coatings, and fungus control methods. The Quartermaster Corps (212) is seeking improvements in lining five-gallon gasoline tanks; better cold check and solvent resistant finishes for furniture; suitable finishes for nylon helmet liners and aluminum helmets;

chemical resistant coatings for food can containers; and coatings for insecticide containers. The Bureau of Yards and Docks (208) is studying the relative merits of various coatings for the protection of steel piling exposed to sea water as well as continuing studies on maintenance paints for the various Navy shore establishments. Malloy (242) of the Bureau of Aeronautics desires:

1. A finish for hull bottoms of seaplanes that will withstand soaking in water for several months as well as high speed taxiing and that is resistant to growth of marine life.
2. For leading edges of wings, a highly extensible finish with instantaneous rebound, having outstanding adhesion to plastic and metal, and embodying an anticorrosive primer.
3. For general airplane finishing, a finish that is: scuff-resistant, outstanding in adhesion, light in weight, durable for a minimum of two years, and universally applicable to a variety of aircraft structural materials, and be rapid drying.

3.3.2. The Office of the Quartermaster General let a research contract with American Chemical Paint Company, Ambler, Pa. to investigate and develop prepaint treatments and final chemical treatments of metal surfaces, for the protective finishing of designated Quartermaster articles of supply, including metal containers and equipment of hardware.

Products of the Paint Industry

Metallic Coatings

4.1.1. A new ready-mixed aluminum paint that becomes permanently bonded to almost any metal surface upon subjecting the painted metal to heat of 500 to 1600 F has been marketed by SHEFFIELD BRONZE PAINT CORP. Improvements in its Heat-Rem H-170 extra high heat resistant aluminum paint to permit air drying in approximately 30 min. have been made by SPECO, INC. The TROPICAL PAINT AND OIL CO. have developed an aluminum paint for service in the 200-to 1000 deg. heat range.

4.1.2. ROYSTON LABORATORIES, INC. offer an industrial aluminum coating that can be sprayed without spattering objects or surfaces 4 ft. or more in the background. Because of the special vehicle and solvent selected for the formulation of the new coating, it is said to dry upon 4 ft. of travel from the spray gun nozzle to a cottony, nonadhering powder.

4.1.3. THE STEELCOATE MANUFACTURING CO. has developed a surface coating which is said to perform many tough jobs not satisfactorily performed by pigmented paints and enamels. Applied by either brush or spray gun, the coating's color is that of unpolished stainless steel. SPECO, INC. developed a gold-colored extra high heat resistant paint, known as Heat-Rem EG-170 Gold. Made of copper flakes in a silicone base, the paint will withstand temperatures up to 1700 F.

4.1.4. METALLIZATION, LTD. of Dudley England is marketing fully automatic mettalizing equipment. All ferrous and nonferrous metals produced in wire form can be applied by metallizing to a wide variety of products including all metals, glass, wood, paper, ceramics, carbon and many plastic base materials.

Paints and Enamels

4.2.1. Pozcote, a corrosion-resistant synthetic coating for wood, masonry, and metal surfaces has been introduced by the MONROE CO. INC. A synthetic-resin based finish, it is claimed to be impervious to water, acid, alkalies, alcohols. Nu-Pon A, a resin-base coating for exterior metal finishing, developed by the GLIDDEN CO. Said to provide a film about 5 times thicker than most paints, is applied by special spray gun. Leak Lock, dries in air to a flexible finish that is resistant to a wide variety of chemicals, introduced by HIGHSIDE CHEMICALS CO.

4.2.2. Paint-O-Plast, to cover wood, cement, brick, wall board and most other surfaces, usually without a priming coat, by ENTERPRISE PAINT MFG. CO. Force Dry Overpaint, a high-gloss, quick-drying paint for posters and display signs, by the GLIDDEN CO. Polyenamel, designed to overcome the difficulties in decorating polyethylene, is said to withstand fingernail and Scotch tape test, issued by SCHWARTZ CHEMICAL CO., INC.

4.2.3. Rust-Check, for use in the protection of chromium plate systems, available for high, medium or low baking schedules, by RINSHED-MASON CO. Ricwilite 1060 and Richwilite 7100, phenolic resin coatings for corrosion control, by RIC-WIL PLASTIC COATING & MFG. CORP. Pennpaint 229, a chlorinated aliphatic hydrocarbon base coating for protection against corrosion, PENNSYLVANIA SALT MFG. CO.

4.2.4. C 5138, a finish for polystyrene, available in all standard colors, in gloss, semi-gloss and flats, by UNITED LACQUER MFG. CORP. Styrophane, an organic coating for polystyrene, designed to withstand high humidity, available in clear, pastels, and metallic colors, by STANDARD-TOCH CHEMICALS, INC.

4.2.5. New latex base paints marketed include: Gold Bond Velvet by NATIONAL GYPSUM CO.; Vel-Va-Cote by GENERAL PAINT CORP; and, Rev Satin by AMERICAN-MARIETTA.

Primers

4.3.1. Leafcote by MID-AMERICA STEEL WAREHOUSE, INC. carries phosphatizing and painting a step further. After both sides of either cold or hot rolled steel sheet have been degreased, pickled and phosphatized, they are heated, after which Leafcote is bonded and baked on for toughness and lasting adhesion. Nu-Pon by GLIDDEN CO. is an alkali resisting primer for use in laundry appliance coatings. EC—1189, a tough, sprayable black-asphalt material for protecting underbody parts of transportation equipment, by MINNESOTA MINING AND MANUFACTURING CO. UNITED LACQUER MFG. CORP. developed a white synthetic undercoat, claimed to give marginal wood the appearance and finish qualities of gumwood. DuPont Sealer-Coater, an undercoat for wall painting, is sold in semi-paste form, and thinned with water, by DU PONT.

4.3.2. A Vinylite resin lining for steel drums that will flex to the contour of a dented container is marketed by GATES ENGINEERING. U. S. STONEWARE CO. developed Tygorust, for use on rusted steel surfaces without the necessity for previous preparation. VORAC CO. is marketing a vinyl wash primer, Vorac H-400. THE UNITED LACQUER MFG. CORP. has announced a fast-drying black universal primer, vinyl-based, VB 282.

4.3.3. Overust, a menhaden-vegetable oil base primer with special chromate pigments, by CHEM INDUSTRIAL CO. can be used with a minimum of surface preparation. Rust-Cure, a similar performing product, by THE MONROE CO., INC. Prufcoat Primer P-50, a heavy-duty metal primer effective on corroded metal surfaces by PRUFCOAT LABORATORIES, INC. A metal primer recoatable in 10 minutes, SP-3523 H by THOMPSON & CO. Rust-Inhibitor No. FD-425 by UNITED LABORATORIES, INC. also dries in 10 minutes and is exceptionally resistant to temp. salt air, and fumes.

Lacquers

4.4.1. POWR-PAK, INC. has announced the development of a fast drying, color lacquer spray formulation for repainting or touching-up machinery and equipment that is shipped broken down and assembled at its destination. Sprayed from Aerosol dispenser. UNITED LACQUER MANUFACTURING CORP. developed BO 562, a synthetic lacquer with unusual hardness and high resistance to tarnishing for application to all metal surfaces. NEW ENGLAND LACQUER CO. has produced an im-

proved polystyrene lacquer featuring high gloss and strong adhesion.

4.4.2. ALUMNI-GARD Co. is selling a protective lacquer for aluminum storm windows to keep them bright and shiny. MINNESOTA MINING & MANUF. is selling a colorless finish for automobile metal trim, Corogard.

Varnishes

4.5.1. ELECTROFILM CORP. has an insulating varnish with the advantages of silicones at less cost, Insul-Film. GENERAL ELECTRIC CO. is marketing an oil-modified phenolic varnish, G.E. 9700, for insulating electrical equipment. Synthetasin 100, a protective coating for steel shipping drums and paints, based on R-108, is offered by SYNTHETASIN PROTECTIVE COATINGS, INC. IRVINGTON VARNISH AND INSULATOR CO. have Fura-Tone 1347, used for chemical resistant cement.

Specialties

4.6.1. FLASH-STONE CO. developed Tarlac, a coal tar pitch finish for concrete. Printed resistors and resistance films available from GLASS PRODUCTS CO. The MICRO-CIRCUITS CO. offer temperature sensitive resistor paints for many uses. CHEMICAL DEVELOPMENT CORP. developed a strippable coating for Lucite, Plexiglas and other acrylics, called CD Strip A. Rubber tire makers circumvent government regulations banning white side wall tires by baking on a plastic paint — available in wide range of colors also.

4.6.2. THE STOP-RUST CO. developed Stop-Rust which has the property of absorbing and evaporating moisture from the pores of the metal. HOMECRAFT Rust Remover is a new de-corrosion compound. A caulking compound of liquid synthetic rubber, Sealer 900 has been produced by MARINE PRODUCTS, INC. STONHARD CO. has a silicone base water sealing compound for above grade masonry. RANETITE MANUFACTURING CO. also has a silicone-based water repellent for masonry. ARKANSAS CO. developed a waterproofer for textiles from a non-foaming silicone resin and urea resins.

4.6.3. NIELCO LABORATORIES introduced a new corrosion control process called Nielizing. The new process for ferrous metals produces a cleaned surface suitable for paint or coating. OCTAGON PROCESS, INC. developed Rustshield 2, a phosphatizing compound to produce oil-retaining rustproof surfaces.

Application Equipment

4.7.1. DUALHEET INC. is offering a low cost, tandem type paint heater that can be mounted on a wall or equipped with castors for moving. Tandem installations can be gauged together in one jacket so that several colors are available at proper temperatures. E.L. WEIGAND designed the Chromalox Type TBL electric tank heater to include a vapor-tight terminal box as standard feature. Heavy duty Chromalox tubular elements are welded to the sealed, electrical connection housing and the wiring is brough out to the terminal box through a thick-walled steel pipe. The Bede Model R Paint Heater offers wide versatility, heating from a small quantity of lacquer or enamel, up to six quarts at one time. Finishes can be heated directly in the gun-cup, in original containers up to a gallon, or mixed in the heater pot. The heating element is cased in an aluminum explosion-proof housing which also contains all electrical controls. BEDE PRODUCTS, INC. THERMALCUP, INC. has developed a new type heating cup for hot-spray lacquers. The quart size cup is featured and fits all standard cup guns. Working temperature is reached in 8 to 14 minutes, depend ng on the thermostate setting.

4.7.2. BINKS MFG. CO. has a new lightweight spray gun which reduces fatigue. Known as Binks Model 29 Spray Gun, body is aluminum casting, contains cartridge-type air valve for quicker replacement and is recommended for production line, touch-up or maintenance painting. PENNSYLVANIA SALT MFG. CO. has developed a new conditioning agent for industrial paint spray booths. Called PB-1, it is used in the water circulating systems to prevent adhesion of paint to the curtain wall, to assist the water cascade in preventing escape of paint into the atmosphere.

4.7.3. Dustfoe #55 weight only 2¾ ounces. Breathing resistance has been cut in half. Reduction in width of the filter holder eliminates a "blind-spot" area and increases downward vision. MINE SAFETY APPLIANCES CO. An economical method of masking portions of metal articles to be plated has been developed by the AMERICAN AGILE CORP. by flame spraying a nonporous and chemical inert coating of polyethylene on portion not to be plated.

4.7.4. L. R. WALLACE & CO. developed the Walco coater, a new roller coater, which applies paint, lacquer, adhesives and oil to any flat surface up to 3800 linear ft. per hr. and up to 850 sq. ft. per gallon. A new line of roller coaters has also been announced by the UNION TOOL CORP. Increased die life, decreased scrap, uniform coating are among product features.

4.7.5. E. L. WEIGAND announce pre-engineered electric infra red oven panels with higher infra red output per square foot with variable control on amount of heat released. The MEYER-CORD CO. has developed (384) to commercial reality a new method of drying coatings of an oil, alkyd, or amine base composition by treating the applied coating to sulfur dichloride vapors. Hard, tack-free coatings are achieved in two to 30 seconds depending on the type of vehicle. Method is reported feasible for the protective and decorative coating field, artificial leather, coated leather, corrosion resistant linings, linoleum, glass-bottle printing, etc.

Oils and Fatty Acids

Business and Economic

5.1.1. Producers of fatty acids (479), spurred by a specter of oversupply, held a full-scale meeting, and became the Fatty Acid Division of the Soap and Glycerine Producers Association. The need for joint development work—to do what individual producers can't accomplish — was stressed as the key to expanding markets, continuing profits. Enterline (199) outlines what the paint and resin manufacturers desire from the fatty acid producers in the way of products.

5.1.2. The Fats and Oils Division (496) of the Bureau of Census is studying the statistical work of the Fatty Acid Division of the Association of American Soap and Glycerine Producers to evolve a new bookkeeping method for fatty acids. More complete census as well as more practical reporting to the needs of the industry will result.

5.1.3. Castor oil processors (482) looked at price decreases on capryl alcohol as a clue to future changes in castor oil distribution. For the third time in less than six months, Rohm & Haas dropped its price of capry alcohol, a by-product in making sebacic acid from castor oil. While sebacic production probably takes less than 6 of the 84 thousand tons of castor oil produced, oil processors see it as a bright opportunity to expand sales. The Government, forseeing increased war needs for castor oil, has (1) set a 10c floor on payments to farmers for castor beans, (2) restricted use in protective coatings to 60% of base period (protective coatings normally consumes 40% of castor produced), (3) restricted export both of beans and oil, and (4) stockpiled the oil.

5.1.4. Patton (156) examines the historical and present day supply picture on castor oil and reports that the domestic castor crop is increasing in volume. Use of dehydrated castor oil in spar varnishes, aluminum paints, exterior and interior house paints, calcicoaters, emulsion paints, traffic paints, marine primers and paints,

zinc chromate primers, baked can coatings, etc. is described with formulations, performance advantages and methods of use given.

Technical Bulletins

5.2.1. FATTY ACID CHART. The composition and important physical properties of the 46 most widely used processing oils and fats is printed in two colors on durable stock measuring 17" by 11". Included is data on the iodine number, saponification value, percent of unsaponifiables and normal fatty acid composition. The empirical formulae, molecular weights and acid numbers of 23 fatty acids in common use is also included. E. F. Drew & Co.

5.2.2. NITROPARAFFINS. Handling of nitroparaffins is discussed in a 4-page folder by Commercial Solvents Corp. SAFFLOWER OIL. Safflower Oil's growing and industrial uses are featured in a bulletin released by the Pacific Vegetable Oil Corp. 1952 SOYBEAN BOOKLET. Latest information concerning the soybean crop and industry is presented in the 1952 edition of the SOYBEAN BLUE BOOK. Assembled for quick reference are tables on production of soybeans by states and years, with prices and utilization of soybean meal and oil. Directories of soybean processors, oil refineries, and manufacturers using soy products are included. Book available at $1 per copy from American Soybean Association. TALL OIL IN EMULSIONS. Ninth of a series of tall oil bulletins issued by The Tall Oil Association. It discusses the availability of tall oil, emulsions, emulsifiers, the making of emulsions and equipment for the making of tall oil emulsions, soluble oils, polymerization, cutting oils and asphalt emulsions. TUNG LITERATURE. References and abstracts of some 3,000 articles and patents relating to tung trees, processing of the fruit, chemistry and technology of the oil and meal have been compiled by R. W. Planck and Frank C. Pack of the Dept. of Agriculture's Southern Regional Research Laboratory.

5.2.3. COTTON SEED FATTY ACID. Groco 35 is a double distilled cottonseed fatty acid, recommended for alkyd resin manufacture because of its exceptionally light color. Specifications are: Titre 36-39 C; Color Lovibond 5¼ Red 1.0-2.0; Color Lovibond 5¼ Yellow 5-15; Color Gardner 1933 1-3; Unsaponifiable 1.5% max.; Saponification Value 201-206; Acid Value 200-205; Iodine Value (Wijs) 90-100. A. Gross & Co.

Styrenated Oils

5.3.1. Daniel (184) shows that styrenation of oils and alkyds upgrade properties of hardness, gloss, color and chemical resistance. A styrenated oil approaches an alkyd whereas a styrenated alkyd approaches an amino-modified alkyd in these respects. Styrenated alkyds show some adhesion loss on outdoor exposure but are equal or better to normal alkyds in regards gloss retention. On interior exposure, the styrenated alkyds have outstanding gloss retention and non-yellowing characteristics. Styrenated alkyds were found to be no worse in hydrocarbon solvent sensitivity than rosin modified alkyds that approach the drying speed of the styrenated alkyd. Baking or addition of melamine improves the solvent resistant characteristic of styrenated alkyds. Lifting of styrenated alkyds on recoating is influenced by the formulation and can be avoided by proper scheduling of recoats.

5.3.2. Armitage and Sleightholme (67) manufacture interpolymers by heating styrene and drying oil fatty acids in the presence of alpha terpene which has been activated by blowing with oxygen.

5.3.3. Sleightholme (66) produces a styrene drying oil copolymer by heating a mixture of styrene with the unsaturated extract obtained from lubricating oils treated by the Edeleann process and with a polyhydric alcoholic mixed ester.

5.3.4. SOYASTYRE. A Styrenated soyabean oil with no styrene odor; for quick drying protective coatings with good water and alkali resistance and good adhesion, gloss and color retention. Supplied at 70% solids in mineral spirits, viscosity Z3-Z5; color, 12 max.; acid no. 100% solids- 8 max. Woburn Chemical Co. ISOTYRE. A styrenated dehydrated castor oil with no styrene odor for rapid drying, hard protective coatings of exceptional water, alcohol, and alkali resistance with outstanding adhesion, gloss and color retention, good can stability. Supplied at 70% solids in mineral spirits, viscosity Z5-Z7; acid no., 100% solids- 6 max.; Color 6 max.; Woburn Chemical Co. STYRENATED FATTY ACIDS. Intermediate with no free styrene odor for preparing styrenated alkyd resins of quick set and dry. At 100% solids: M.P. 60 C; acid no. 68-75; styrene content, 48%. Woburn Chemical Co.

5.3.5. Emulsion Copolymerization of Styrene with Bodied Oils. Robinson (63) suspends a bodied oil (linseed or dehydrated castor) a glycerol phthalate alkyd resin modified with the same oil, and styrene in water and obtains copolymerization by heating.

5.3.6. Falkenburg et al (285) present data and properties of products obtained by polymerizing styrene in the presence of drying and semi-drying oils. Evidence is given showing that conjugation in an oil or peroxide content are not of fundamental importance for obtaining homogeneous products. The increasing viscosity of the oils appears to lead to the formation of styrenated products of higher homogeneity. Data on the products obtained on polymerizing styrene in the presence of various methyl esters of fatty acids show that no copolymerization between the esters and styrene occurs and that homogeneity of some of the reaction products cannot be considered as proof for interpolymerization.

5.3.7. Armitage and Kut (189) studied the mechanism of the reaction between styrene and conjugated acids. The reaction of styrene conjugated oil triglycerides will be similar to that with the acids themselves although some modification may be expected due to steric factors. Reaction involving the triglycerides may, under certain conditions of reaction, lead to the formation of three dimensional copolymers, and gelation may occur due to cross linking. This is in fact observed in the reaction of styrene with the tripley conjugated tung and oiticica oils. In addition, the natural vegetable oils contain a number of minor constituents such as anti-oxidants and photo-sensitive pigments that may have some kinetic effects on the copolymerization. It is possible that a styrene-oil copolymer chain can be rendered compatible with free oil by virtue of the presence of a certain proportion of Diels-Alder compound which also has considerable influence on the oxidation of the film and subsequent hardness. Practical development has shown that where difficulty occurs in obtaining compatible products with the non-conjugated oils, the use of blends or mixed esters of these oils with the triply conjugated oils has led to greatly improved products.

Tall Oil

5.4.1. Ford and Brewster (254) illustrate method of improving tall oil esters by:

1. Esterifying with sorbitol at top temperatures with 0.1% lime as catalyst. For acid numbers of 20 or less, the substitution of 20-40% of sorbitol with other polyols is advisable. The color of the all-sorbitol or mixed polyol tall oil ester is largely determined by the intrinsic color of the tall oil.

2. Modification of tall oil esters with maleic anhydride and/or phenol condensates is effected by the procedures applicable to rosin. After complete reaction of the maleic anhydride with the tall oil, china wood oil may be reacted to yield long oil varnish for use alone or for blending with shorter oil varnishes.

Test results and cooking procedures are given.

5.4.2. Bosch and Drubel (145) styrenated and esterified tall oil acids that varied in rosin and fatty acid contents. Tall oil can be styrenated relatively

easily when a mixture of styrene, alpha methyl styrene, and benzoyl peroxide is added at a very slow rate. The percentage of styrene could be increased by increasing the percentage of rosin acids and consequently decreasing the fatty acid percentage. This phenomenon cannot be explained by Farmer's theory since the styrenation mechanism is dependent upon the presence of an alpha methylene group next to the conjugated double bond. The properties of the styrenated esterified tall oils were as expected. Using an oil, containing largely fatty acids, a slow drying film with very good flexibility was obtained. Selecting a tall oil with 70% rosin acids, an extremely fast drying, hard and brittle film resulted. Blending these two types of tall oil in a ratio of 1:1 produced varnishes of very good quality after styrenation and esterification. These varnishes also proved to be good paint vehicles.

5.4.3. Jones and Foreman (360) found tall oil to be particularly susceptible to separation by application of liquid thermal diffusion. Thermal diffusion was found to concentrate rosin acids in the cold-wall fractions and fatty acids in the hot-wall fraction. When the hot-wall fraction is thermally diffused a second time, a separation of the fatty acids occur with the more unsaturated types concentrating in the cold-wall fraction. Unsaponifiables concentrate in the cold-wall fractions.

5.4.4. Hasselstrom (32) produces refined tall oil by mixing sulfuric acid with an aqueous tall oil soap containing sterols and color bodies and an organic solvent. The mixture separates into two layers with the color bodies in the water and tall oil in the organic solvent.

5.4.5. Putnam (79) has a stabilized tall oil nitrile consisting of dehydrogenated tall oil nitrile and hydrogenated tall oil nitrile free of emulsion polymerization inhibitors and abietonitrile. Putnam (80) also has an amine of a stabilized tall oil, suitable for use in cationic emulsification of peroxide-catalyzed emulsion polymerization systems.

5.4.6. Peters (102) obtains a new composition of matter by reacting cyclopentadiene and tall oil. Marling (70) obtains a vinyl tall oil coating composition by heating, in an inert atmosphere, vinyl tall oil esters with anthraquinone. Marling (38) prepares a coating composition by heating vinyl esters of tall oil acid with styrene and isopropylbiphenyl in the presence of peroxide catalyst.

5.4.7. Newport Industries, Inc. has made available three refined tall oils. ACONON: This refined tall oil has a slightly higher fatty acid content and lower rosin acid content than either Acolin or Acosix, and has an extremely low unsaponifiable content. Fatty Acids, 72%; Rosin Acids, 25%; Unsaponifiable, 3%; Acid Value, 187; Saponification Value, 191; S. G. 0.937; Color, 5-6 (Hellige); Viscosity, C-D (Gardner). ACOLIN: This refined tall oil is very much like Acosix in its physical and chemical characteristics, but it has been further processed to improve its odor and color. Fatty Acids, 68%; Rosin Acids, 26%; unsaponifiable, 6%; Acid Value, 178; Saponification Value, 184; S. G., 0.945; Color, 4-5; Viscosity, G-H. ACOSIX: A refined and distilled tall oil which has a pale color, mild tall-oil-like odor, and a low unsaponifiable content. Fatty Acids, 68%; Rosin Acids, 29%; Unsaponifiable, 3%; Acid Value, 188; Saponification Value, 191; S. G. 0.933; Color 5-6; Viscosity, C-D.

Modification of Oils

5.5.1. Wiebe (78) improves the drying properties of fatty oils by heating the oil in the presence of a peroxide compound containing a tertiary-alkyl peroxy radical. Fisher et al (89) obtains a modified drying oil comprising the oxidative copolymerization products of a drying oil and a polymerizable organic solvent soluble monomeric ether of an aliphatic polyhydroxy compound. Danforth (14) obtains a drying oil composition by co-bodying an unsaturated amine with a drying oil. Harvey (13) obtains a modified drying oil by heating a fatty oil with the reaction product obtained from furfuraldehyde and mesityl oxide under alkaline conditions. Geiger (75) makes a drying oil base coating composition by heating a fatty drying oil with the alcohol soluble condensation product of phenol and a natural cyclic terpene.

5.5.2. Radlove (33) produces improved drying and semi-drying oils by catalytic isomerization of drying and semidrying oils by heating the oil with a quinone. Freeman (31) processes mixed glycerides by extracting with furfural, then extracting the furfural-glyceride solution with liquid paraffin to separate the glycerides, saponify the saponifiables and extracting the unsaponifiables with petroleum hydrocarbon. Mattil and Sims (292) describe a method for producing monoglycerides containing up to 78% of monoesters. It involves the interaction of fat with glycerol in a tertiary aromatic nitrogeneous base and employs an alkaline interesterification catalyst such as sodium methoxide. Fisher (16) exposes drying oils to a high frequency electric field as a method of treating vegetable drying oils. Carter and Bristow (101) dehydrate castor oil by heating castor oil in the presence of ortho-phosphorous acid.

5.5.3. Rhoades and DaValle (284) studies the heat polymerization of safflower oil and report that: (1) the polymerization rate of safflower oil is sufficiently rapid to warrant its use on a commercial scale; (2) with the proper choice of polymerization temperature, safflower can be bodied at the same rate as linseed; (3) safflower heat bleaches considerably better than linseed and is also equal to or better than soya in this respect. They believe that the increasing rate at which safflower bodies in the high viscosity range invites further investigation.

5.5.4. Slansky (239) discusses the ability to improve the alkali resistance of drying oil films by sulfurizing the oils. Vogel (23) has a process of treating a drying glyceride oil containing drying inhibitors with a heavy metal organic carboxylic acid salt and then aerating with oxygen with the oil at 230 to 280 F. to reduce the inhibitor content. Jordan and Wittcoff (41a) clarify an oil produced by esterifying a fatty acid with a polyhydric alcohol in the presence of a lead esterification catalyst by treating the oil with phthalic anhydride and removing the precipitate formed.

5.5.5. Henson and Edwards (123) obtain a dispersion of polymers in drying oils by dissolving an oil-soluble emulsifying agent in a drying oil to which an aqueous polymer dispersion, formed by emulsion polmerization of monomeric material, is then added. After uniform dispersion in the oil phase is obtained, the emulsion polymer is dehydrated to give a polymer dispersion-in-oil coating composition. Kronstein (21) developed a method of solubilizing an, at least, partially insoluble oil by melting the insoluble oil with a metallic soap of a higher fatty acid ester to form a soluble oil reaction product.

Synthesis of Oils

5.6.1. Arundal et al (68) obtain linear oily polymers from conjugated diolefins when heated under pressure with a momoner of a hydrocarbon soluble catalyst having the formula R $(CH_3)_2COOR'$ where R is a methyl or phenyl and R' is a hydrogen or benzoyl. Hoffman and Block (57) produce a drying oil by subjecting a non-aromatic unsaturated hydrocarbon to conjunct polymerization in the presence of catalyst, purifying, and then bodying. West (41) obtains a drying oil composition from a normally non-drying oil blended with polyolefinic cyclic hydrocarbons. Hillyer and Edmonds (55) produce an improved drying oil by condensing an unsaturated glyceride oil with an aliphatic conjugated polyolefin.

5.6.2. Adams (25) obtains a superior quality drying oil from clay polymer by distilling clay polymer and separating a

reduced clay polymer which is then vacuum distilled to yield a drying oil as the distillate and a drying resin as the bottoms. Goodwin (76) manufactures an improved drying oil from unsaturated polymers obtained in the clay treating of cracked gasoline at elevated temperatures by mixing the polymer with an acid condensation catalyst and adding an aldehyde.

5.6.3. Berry (72) makes a drying oil by dehydrochlorinating a chlorinated paraffinic hydrocarbon by reacting the chlorinated hydrocarbon with alkali metal hydroxide in a solvent of dihydric alcohol or ether plus a catalyst of titanium or zirconium dioxide. Leyonmark (24) obtains a light colored, hydrocarbon-soluble drying oil by making a mixture of 50 to 70% propylene monomer with 30 to 50% of a conjugated diolefin. The polymerization is carried out at 50 to 110 C. at 50 to 600 lbs./sq. in. pressure in the presence of gaseous boron fluoride. Schertz (111) obtains a synthetic drying oil from polyvinyl alcohol by reacting a polyhydric alcohol with an ethylenically unsaturated fatty acid material.

5.6.4. Teeter (105) subjects an ester of an aliphatic acid containing halogen substituted for hydrogen to the action of a salt of an organic carboxylic acid to obtain a drying oil. Geiser (12) developed a process for the production of resinous and elastomeric materials by co-bodying an unsaturated fatty acid ester drying oil and a hydrocarbon drying oil and then reacting with a carbonyl compound. Gleason and Jaros (54) prepare drying oils in a selective polymerization process wherein a conjugated diolefin is heated under pressure with a peroxide catalyst to convert the diolefin into a linear oily polymer. The formation of a solid insoluble polymer is reduced by continually flushing the gas space above the liquid with a portion of the liquid phase. White (379) describes a two-stage continuous distillation system for making color-stable fatty acids with a low cost still.

Basic Studies — Performance

5.7.1. Adams, et al, (129) studied changes in the infrared spectra of some synthetic oils as a function of drying time. He proposes that the changes in the infrared spectra of a drying oil have an interpretation that would support, to some extent, the mechanism of drying as proposed by Farmer. Chipault, et al, (163) report on the changes of ultraviolet spectral absorption due to oxygen absorption of phthalic alkyds modified with several unsaturated fatty acids. Carrick and Snodden (130) investigated six vehicles to determine the depth to which oxygen penetrates drying oil films. The information reported is to be used in conjunction with other research projects of the Federation Research Program to obtain a better understanding of film formation, properties and deterioration.

5.7.2. Garrick and Permoda (131) report on studies on shrinkage of films during aging for seven film forming materials. The reason for the shrinkage upon aging is a result of the complex chemical reactions and by-product evolution that accompanies aging as well as possible progressive compaction of the organic gel structure of the aging film. Elm (132) reports on the stress-strain properties of clear and pigmented films of pure drying oils. The two properties of a stress-strain curve of particular interest are the tensile strength and the shape of the elongation-load plot. Kaiser and Coulliette (133) conducted a detailed study on the hardness, abrasion resistance and accelerated weathering resistance on pure pigmented and unpigmented vehicles. Detailed test results are reported.

5.7.3. Nichols (159) investigated the autoxidation process responsible for the drying oils by studying the infrared spectra obtained from films of: (1) pentaerythritol esters of linseed fatty acids: (2) pentaerythritol tetralinoleate; (3) glyceryl trilinoleate; (4) blown linseed oil; (5) litho linseed oil, exposed under varying conditions of heat, duration of heating, and catalysts. The most noticeable results were:

1. As the exposure time increased, a hydroxyl grouping was formed and the carbonyl groups increased along with the formation of other functional groups.
2. Increasing temperature increased the rate of obtaining these changes. However, the maximum hydroxyl concentration decreased with increasing temperature while that of the carbonyl increased.
3. Driers increased the rate of attainment of the maximum values in both hydroxyl and carbonyl curves. The maximum value of the hydroxyl curve is increased in the presence of driers while that of the carbonyl is unchanged by a cobalt-lead combination and decreased by cobalt and lead used singly.

5.7.4. Davis et al (157) studied various catalysts at various concentrations to determine the most desirable catalyst/concentration for aiding alcoholysis of soybean oil with pentaerythritol. The results are summarized in Table VII.

5.7.5. Dunbar (139) studied the chemical changes with aging of films prepared from specially prepared oils and compounds and pigmented with titanium dioxide and zinc oxide. He reported:

1. The paint pigments, as formulated, provided almost complete protection for the vehicle from the harmful effect of ultraviolet light. The acid values of the pigmented oils did not show the sharp increases exhibited by the clear oils.
2. The breakdown of varnish films is ordinarily attended by an increase in acid value. This seems to indicate that hydrolysis of the ester linkage occurred on a large scale.
3. There was some evidence of yellowing in darkness with the pure esters of linoleic acid.
4. High humidity did not tend to hydrolysize readily the alkyd resin vehicles.
5. The dipentaerythritol esters appeared to be somewhat more easily hydrolyzed than those of pentaerythritol.
6. The alkyd resin vehicles showed remarkable resistance to the chalking of pigment. Zinc oxide leached freely from the non-alkyds.

5.7.6. Chipault et al (134) studied the oxidation of unsaturated fatty acids of polyhydric alcohols. They report that:

1. Thin films of glycerol, pentaerythritol and dipentaerythritol esters of oleic, linoleic, linolenic and eleostearic acids have been oxidized to high levels of oxygen absorption.
2. With the unconjugated esters, the rate of oxygen uptake increased with the degree of unsaturation of the fatty acid and was independent of the alcohol part of the molecule.
3. Oxidation of the esters of linoleic acid and linolenic acid was accompanied by development of diene conjugation and the films did not appear "set" or "hard" until considerable amounts of peroxides had been accumulated.
4. With the eleostearate esters and dehydrated castor oil containing preformed conjugated systems, the films dried very rapidly and at very low peroxide levels. Oxidation resulted in destruction of the conjugated centers.
5. For all the compounds studied, fractions of the oxygen absorbed ranging from .28 to .71 appeared as peroxides. In the case of linoleates and linolenates, the conjugated diene groups formed during oxidation appear to be the principal functional groups involved in polymerization up to the time the films become set.

5.7.7. Hess and O'Hare (364) compare experimental data on oxygen absorption, weight change, and film yellowing of synthetic fatty acid triglycerides with those obtained from natural drying oils under similar conditions. Oxygen and weight changes of the synthetic triglyceride films over long drying periods indicate the influence of the component acid radicals on the drying of natural glyceride oils. The significance of the individual fatty acid radicals in film yellowing is shown.

Basic Studies — Synthesis

5.8.1. Paschke et al (352) studied the kinetics and mechanism of polymerization of isomeric forms of methyl linoleate to gain an understanding of the reactions of heat polymerization of drying oils. Conjugated linoleates polymerize much more rapidly than nonconjugated isomers. Trans-trans conjugated linoleate polymerizes more rapidly than the cis-trans conjugated isomer; cis-trans isomerization occurs at bodying temperatures, with both conjugated and nonconjugated isomers. Dimer to trimer ratio is uniformly high for conjugated trans-trans, and uni-

formly low for conjugated cis-trans linoleate. Non-conjugated linoleate has a high ratio at low conversion and a low ratio at high conversion; non-conjugated trans isomers require modification of the spectral method for their determination because of slow isomerization with alkali. Non-conjugated isomers apparently dimerize largely by thermal conjugation, followed by Diels-Alder addition of the conjugated isomer with a nonconjugated linoleate. Conjugated linoleates dimerize by Diels-Alder addition.

5.8.2. Wheeler (128) reports on studies on the polymerization methods of pure methyl esters of isomeric linoleic and linolenic acids. Youngs and Craig (287) use dimethyl sulfate for preparing esters of fatty acids with yields of over 99%. The procedure eliminates conversion to free fatty acids and the esterification is carried out under nearly neutral conditions with a shorter reflux time.

5.8.3. Knight et al (286) autoxidized methyl oleate, irradiated with ultraviolet, at various temperatures for various periods of time. At all temperatures studied about 2.5 to 3.0 atoms of oxygen were introduced per mold of methyl oleate. The autoxidation reaction was exceedingly complex. Magne and Skau (321) constructed the binary freezing point diagrams for each of the polymorphic forms of acetamide with lauric, myristic, palmitic and stearic acids. These give conclusive evidence of molecular compound formation between acetamide and each of these acids.

5.8.4. Norris et al (289) report that concentration of trichlorethylene of greater than .003% retards the rate of hydrogenation of vegetable oils without any apparent effect upon selectivity of hydrogenation. However, it is not an irreversible catalyst poison, and oils containing large amounts of trichlorethylene have been successfully hydrogenated. In most cases where inhibition occurred, purging of the converter, extra catalyst, or addition of normal quantities of catalyst in divided portions improved the hydrogenation rate.

5.8.5. Berger (293) describes a continuous operation under automatic instrument control to distill fatty acids with improved quality, uniformity and yields. Dunbar (140) reports changes in refractive index of oils and resins with time. Swern (27) developed a process of producing 9,10-dihydroxystearic acid by oxygenating oleic acid dissolved in acetic acid and cobalt acetate. Zilch et al (302) describe a simple procedure for the preparation of methyl linoleate hydroperoxide. Roe et al (288) worked out conditions for the quantitative conversion of various oils to amides and glycerol by reaction with liquid ammonia under pressure.

Basic Studies — Analytical

5.9.1. Ward et al (299) observed three distinct melting points of beta tung oil. The specific heat of beta tung oil was found to be higher when the sample was rapidly cooled than when it was slowly cooled or tempered. The liquid glycerides present at any temperature in the melting range was estimated from the heat content of the oils. The rate of liquid phase formation increased sharply during the final 10 degrees owing to the greater homogeneity of the glycerides.

5.9.2. Singleton (298) determined melting dilations for the even-numbered saturated n-fatty acids in the series, lauric through stearic, and some of their glyceryl esters. The melting dilations of the mono-, di-, and triglyceryl esters of a fatty acid were found to be proportional to the acid residue content of each compound. The increment of melting dilation of the fatty acids and glyceryl esters increased regularly with each addition of two methylene groups.

5.9.3. Mikusch (296) describes experimental work to explain the nature of Smit's Linoleic Acid Isomer, 8t, 10t-Octadecadienoic Acid. Jackson et al (301) reports on extensive infrared examination of various isomers of linoleic acid. Freeman (317) reports on the infrared absorption spectra of twenty seven branched long-chain fatty acids. The data presented should have some usefulness in structural work if further research confirms them and does not reveal too many exceptions.

5.9.4. Sinclair et al (318,320) measured the infrared absorption spectra of several unsaturated fatty acids, methyl esters and brominated derivatives. A spectrographic method is proposed for the degree of unsaturation of mixtures of cis-unsaturated acids. The spectra of liquid films or solutions of stearic, oleic, linoleic and linolenic acids do not differ sufficiently to permit the spectrographic analysis of the individual acids in complex mixtures. Jones et al (319) observed a progression of absorption bands of uniform spacing and intensity between 1180 and 1350 cm^{-1} in the spectra of fatty acids in the solid state. The changes induced in these bands by alteration in the chain length, the introduction of substituents and the replacement of the terminal carboxylic acid by other groups have been investigated. It is suggested that the bands arise from interactions among the methylene groups.

5.9.5. Holman determined (310) the positions of a series of single unsaturated fatty acids in a carrier displacement chromatogram using methyl esters of even saturated acids in one series and methyl esters of odd saturated acids in another, using Darco G 60 as absorbent and 95% ethanol as solvent. As the number of isolated double bonds increase, the adsorption decreases; changing a saturated acid to an unsaturated acid to an acetylenic acid decreases adsorption; conjugation of double bonds increases adsorption. Separation of stearic and linoleic acids and of linoleic and its conjugated isomer by carrier displacement is demonstrated.

5.9.6. Brice et al (304) restandardized spectrophotometric methods of analysis for the polyunsaturated constituents of oils and fats for several conditions of alkali-isomerization, using purified methyl esters of linoleic, linolenic, and arachidonic acids prepared by physical rather than by chemical means. The natural fatty acid standards lead to significantly higher accuracy and their use in the spectrophotometric analysis of natural fatty materials is strongly recommended. The glycerol-air technique is preferred for general use because of its simplicity and high precision. The ethylene-glycol-nitrogen technique is a close second choice because of the greater transparency of reagent blanks.

5.9.7. Herrlinger and Compeau (306) describe a new method for determining rosin acids in fatty acids over a range of 0 to 15%. The method is based on an acid catalyzed selective esterification of a large sample, removal of the acid catalyst, titration of the unesterified rosin acids, and application of an empirical correction. Hunt et al (303) developed a rapid dielectric method for determining the oil content of soybeans. Pack et al (300) use catalytic hydrogenation as a quantitative method for the measurement of total unsaturation in tung oil and related products containing conjugated unsaturated. Shaw et al (295) report that ASTM Method D 555-47 gives fair checks in any one laboratory but poor checks between laboratories. The Gardner Heat Break Procedure was found to correlate with the present Foots test. It is believed that a test based on chromatographic adsorption may offer a more rational basis for comparison of the quality of samples of raw linseed oil.

5.9.8. Knight et al (378) developed a new method of identification for long chain fatty acids, methyl esters, alcohols and vinyl esters. The compound is reacted with urea to give a urea complex. The dissociation temperature is specific for each complex and serves as a means of identification of the compound. Heiberger (220) describes the method of extractive crystallization between urea and fatty acids to separate fatty acids

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Dispersibility of Aluminum Silicates Vs Magnesium Silicates In Zinc Chromate Primers

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ALUMINUM SILICATES, prepared from china clay, have been thoroughly evaluated as the inert in Military Specification MIL-P-6889A, zinc chromate primer for aircraft use. Zinc chromate formulations in which various aluminum silicates (kaolins) replaced magnesium silicates (talcs) in the control passed all of the qualification tests called for in the specification.[1] During these tests it was observed that aluminum silicates gave good final products and dispersed readily. Thus, a shorter milling time could be used when aluminum silicates were incorporated into the primer, or if the same milling time was given, a higher fineness of grind resulted. This ease of dispersion of aluminum silicates in various vehicles has been recognized for some time by paint manufacturers. Within the past year certain raw material suppliers have specifically included a water-washed, water-fractionated aluminum silicate of 4 micron maximum particle size in their recommended formulas for the 6889A primer [2,3,4]

The present study was undertaken to establish quantitative data on the degree of dispersibility of aluminum silicates in 6889A primer vehicle under controlled conditions. Another objective was to compare the rate of dispersion of aluminum silicates with that for magnesium silicates and determine the probable causes for any differences observed. Such data, it is hoped, will serve as a basis for recommendations for more rapid and commercial production of this primer and similar coatings.

Experimental Procedure

FOR this study seven different aluminum silicates (kaolins) and six magnesium silicates (talcs) were selected. See Table I. The aluminum silicates were all water-purified kaolins from Georgia. One of these was unfractionated — the others represented different particle size fractionations. Their mean equivalent spherical particle diameters were 1.6, 4.2, 0.8 and 0.6 microns, respectively, see Figure 1. Three samples of the fine (0.6 micron) fraction were studied, comprising material processed by two different pulverizing methods and one product coated with a stearate. Two samples of the intermediate fraction were included. One of these had been dried directly from aqueous suspension deflocculated with tetrasodium pyrophosphate, and thus was "predispersed" as to its behavior in water.

The magnesium silicates (talcs) chosen included two fibrous, two platy, and two mixtures of acicular and laminar hydrous magnesium silicates. One of these was produced in California, another in Georgia, three originated in New York State and the sixth was of undetermined origin. These products ranged in particle size from very finely ground so-called "Lo Micron" micronized talc to coarse ground talc with considerable residue on a 325 mesh sieve.

Formulations

Twenty-two formulations, including 38 total millings, were made with these thirteen inert pigments. Milling of many formulations was repeated with good replication of dispersion-time data

Table I

ALUMINUM SILICATES

Inert Pigment	Particle Shape	Mean Particle Size (Micron) Sedimentation Method	Percent Residue 200 Mesh (76 micron)	325 Mesh (44 micron)	Microscopic Character Residues	Oil Adsorption Lb/100 Lb Pigment	Flow Point Requirement Aroplaz 1365X Soln. Lb/100Lb	Time to Reach Fineness of 6 N.S. (Hours)
ASP 100	Individual fine platelets	0.6	.02	.04	Chiefly agglomerates kaolin particles traces of mica	43.0	55.2	10
ASP 200	Individual fine platelets	0.6	.005	.013	"	42.6	57.6	10
ASP 400	Platelets Groups of platelets	4.2	.03	.05	Agglomerates of Kaolin particles Some mica	34.2	48.6	13
ASP 500	Platelets Agglomerates	0.8	.01	.02	"	35.1	46 4	10
HT(S)	Platelets	0.8	.01	.015	"	37.0	52.2	10
ASP 900	Platelets Groups of Platelets	1.5	.01	.02	Few agglomerates of kaolin particles Several sheets of mica up to 175M	34.9	51.0	12
ASP 1100	Platelets Agglomerates	0.6	.02	.04	Agglomerates of kaolin Traces of mica	42.9	54.6	11
			MAGNESIUM SILICATES					
MSP 1	Acicular particles Few long thin needles	8.1	0.95	4.72	Long, thin fibers and bundles of fibers (3-20U) by up to 250 U long large plates 75x75 U Some granular	26.7	67.6	40
MSP 2	Acicular, Max. size 200 U Some granular & massive crystals	6.8	0.82	3.01	Course fibers (10-15) x 500 U plates 100 x 100U Massive crystals Extraneous material	29.3	77.3	40
MSP 3	Platy, Some sheets and agglomerates to 75 U not as many fines	10.8	1.82	13.64	Large plates & sheets 100-195 U square no fibers	21.4	78.9	40
MSP 4	Acicular, many fines, few particles as large as 25 U	6.3	.01	.03	Plates & Sheets to 75 & 150 U A few long fibers	18.9	55.8	17
MSP 5	Acicular, Ratio length to width 5:1 Max. length 60U Many fines	6.9	.04	0.21	Some long needles 200 U plates and granular particles	32.3	71.8	16
MSP 6	Platy and acicular agglomerates 20-50U many fines Few needles	5.9	.02	0.56	Plates 75-125 U Granular agglomerates	25.5	77.8	25

Physical properties of various aluminum and magnesium silicates.

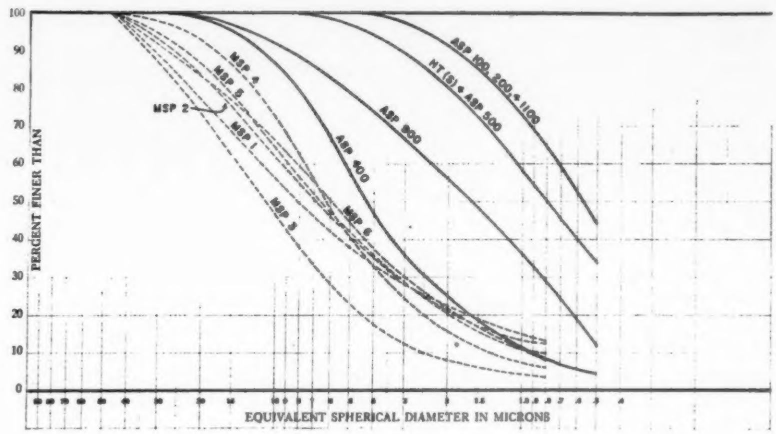


Fig. 1. Particle size distribution curves for siliceous inerts.

in all cases. All inerts were milled in a formulation corresponding to the control formula and directions given in the specification[5] In addition, four aluminum silicates and three magnesium silicates were milled at higher solids contents according to the Daniel Flow Point Method [6,7] but with the finished primer conforming identically to the same final control formula. It is believed that most plant grinding practice is done at solids contents between these extremes. The control grinding formula and milling schedule of 40 hours is comparatively time-consuming. Application of the more efficient Daniel method reduces the milling time to only a small fraction of this period.

All formulations were milled in 1.25 gallon capacity, 8.75 inch diameter, porcelain jars filled to the 50% level with No. B-2 flint pebbles. This amounted to 7 lbs. of pebbles, which number 385, for each mill. Pebbles were carefully graded and then evenly distributed to each mill. The jars were rotated on a jar rolling mill to which a revolution counter was attached. A constant speed of revolution of 60 per minute was maintained throughout this study. The mill was operated through a timer which could be regulated to start and stop the mechanism at any time during the day or night.

Each of the thirteen inert pigments was added for the magnesium silicate in the government control formula Type I as shown in Table II.

It is stated in the specification that a satisfactory primer (Type I) was made in the Government Laboratory using Aroplaz 1365 (60 percent solids) for the alkyd resin solution and Bakelite BK3962 (50 percent solids) for the dispersion resin solution, by loading all of the material above the line in a gallon pebble mill half full of pebbles and grinding for 40 hours, after which all of the materials below the line were added and the grinding continued for 4 hours more.

Type II is stated to have been made similarly except that the initial grind was for 64 hours. After adding the portion below the line, the grind was continued for 3 hours more, after which 290 grams of xylol were mixed in to produce a 53 percent solids primer.

In this investigation the zinc yellow employed was Kentucky Color & Chemical Company's C. P. Zinc Chromate No. 2813, which has proved satisfactory for 6889A primer. The resin solutions employed were those suggested in the government control formula, namely, Aroplaz 1365 and Bakelite BK3962. Other resins, for example, Glyptal 7422 and Aroplaz 1366, have been especially designed for this primer, but were not available at the start of this investigation.

Two experimental procedures were adopted in our laboratory. The first was as follows:

(1) Mix 232 g. Aroplaz 1365
510 g. Xylene
3 8 g. Maleic Anhydride
for 15 minutes in a change-can mixer.

(2) Add to this 700 g. Zinc Chromate
125 g. Siliceous inert
Mix for 15 minutes more in change-can mixer.

(3) Transfer to pebble mill and turn for two hours (7200 revolutions) Take a fineness and continue milling, with fineness determinations every hour or two hours until a fineness of approximately 6 N.S. is reached.

(4) When a fineness of 6 has been obtained, the temperature and viscosity were read[8] and 670 g. Aroplaz 1365
250 g. Bakelite BK3962
6.3 g. Lead Naphthenate Drier (Ferro Chem Co)
2.5 g. Cobalt Naphthenate Drier (Ferro Chem)
2.5 g. Anti Skinning Agent (Advance Solvents & Chem. Corp.)
added. Milling was then continued for 1-4 hours more until complete dispersion was obtained.

Two types of government formulation.

Table II

INGREDIENT	Type I Weight in Grams	Type II Weight in Grams
Zinc Yellow TT-Z-415	700	700
Magnesium Silicate TT-M-90	125	122
Alkyd Resin Solution (60% in Xylol)	232	173
Anti Skinning Agent	—	2.5
Maleic Anhydride	3.8	—
Malic Acid	—	3.8
Xylene TT-X-916	510	400
10 percent Aluminum Stearate Gel	—	100
Alkyd Resin Solution (60% in Xylol)	670	515
Dispersion Resin Solution (50% solids)	250	475
Lead Naphthenate Drier TT-D-651 (24% Metal)	6.3	7.5
Cobalt Naphthenate Drier TT-D-651 (6% metal)	2.5	2.5
Anti Skinning Agent	2.5	2.5

(5) A sample of finished primer was diluted with 50% by volume of toluene and the viscosity of the resulting suspension determined by means of the Zahn #1 efflux cup*.

Milling

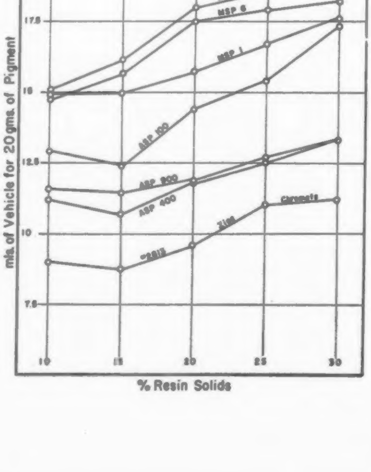
All pigments were milled according to the above procedure and in addition determinations were made to ascertain the effect of interrupted milling as compared to continuous milling and the influence of aluminum stearate additions on dispersion and viscosity. The effect of "letting down" the grinding mix with the remainder of the alkyd and solvent and the dispersion resin before a fineness of 6 was reached, and then continued milling was also studied.

Flow Point Method

THE second experimental milling procedure employed in this study was the Flow Point method of Daniel.[6,7] Daniel assumes a two-fold mechanism of dispersion in closed mills, namely *impact* resulting from the collision of the grinding elements and *inter-particle shear* resulting from the paste motion caused indirectly by the moving elements. It is shown that this second force can contribute many times as much "grinding" work as the impact. The conditions under which this takes place are when the pigment and inert concentration is high, and at the same time the viscosity of the grinding vehicle is low. This is especially true in the case of modern pigments and inerts where dispersion or "fine grinding" is really not a matter of reduction of true particle size, or actual grinding, but rather the breaking up of agglomerates establishing solid-liquid interfaces in place of solid-solid and solid-air interfaces. The Daniel method appears particularly suitable for such breaking of agglomerates.

In order to determine the highest possible pigment concentration obtainable for a given consistency and the proper milling consistency, Daniel devised the relatively simple "Flow Point" method. Briefly, this consists of adding of different grinding resin-solvent solutions of known solids content to a given weight of pigment in each case until the "Flow Point" is reached. This is done conveniently with 20 gms. of pigment in a 100 ml. beaker. The pigment is continuously kneaded and rubbed with a polished glass rod with addition of increments of liquids until the end-point is reached. After each increment of liquid has been thoroughly mixed with the pigment, the rod is removed from the beaker in such a manner as to retain on the rod a quantity of the paste, which is allowed to drain from the rod by gravity. This end-point, known as the "Flow Point", is reached when only a thin even film of material remains on the rod, and when the last few drops, falling at one to two second intervals, appear to break off the tip of the rod with an elastic snap-back like a piece of rubber breaking under load. This end-point is particularly sharp for the aluminum silicates, with the resin solution under consideration and relatively less pronounced for the magnesium silicates. The amount of each solution required to reach the Flow Point for each 20 gms. of pigment is recorded and plotted against the solids content of the solution. The resulting curve usually goes through a minimum or an increase in slope. At this point the maximum pigment concentration of the particular binder-solvent-pigment system is reached. For complete details of the method the reader is referred to the original publications.[6,7]

Figure 2. Flow point determinations with alkyd resin (Aroplaz 1365) - Xylene solutions.



In the present study Aroplaz-Xylene solutions of 10, 15, 20, 25 and 30 percent solids were employed. The Flow Point curves for #2813 Zinc Chromate, three magnesium silicates and four aluminum silicates are given in Figure 2. In most cases, the Flow Point occurred at minimum vehicle content with the 15% solids resin solution. From the pigment-solids content at this point a new milling formula was calculated. This was based upon the same total volume as in the control formula but at higher solids content. After milling, addition of the remainder of alkyd resin and solvent and dispersion resin and driers was made to give same proportions as called for in the control formula. In other words, the final product had the same composition but about two-thirds more was produced per grind. Calculations based upon the Flow Point determinations on the magnesium silicates (talcs) gave formulas with somewhat lower solids contents than those for the aluminum silicates (kaolins) because of the higher vehicle requirements of the talcs. The increase in solids content over the control formula amounted to about 62% for MSP 5, 63% for MSP 6, and 64% for MSP 1. In the case of the aluminum silicates, it was about 67% for ASP 100 and 200, 68% for ASP 900, and 70% for ASP 400. The increase in solids content can be readily seen by comparing with the previous formula and procedure, the Flow Point milling formula and procedure (based on calculations for ASP 100) which follows:

(1) Mix 146 g. Aroplaz 1365
437 g. Xylene
6.4 g. Maleic Anhydride
for 15 minutes in a change-can mixer.

(2) Add to this 1170 g. Zinc Chromate
209 g. Siliceous Inert
Mix for 15 minutes more in change-can mixer.

(3) Transfer to pebble mill and turn for two hours (7200 revolutions). Take fineness and continue milling with fineness determinations every hour until a fineness of approximately 6 N.S. is reached.

(4) When a fineness of 6 has been obtained the temperature and viscosity were read and 416 g. Xylene
1362 g. Aroplaz 1365
418 g. Bakelite 3962
10.5 g. Lead Naphthenate Drier (Ferro Chem)
4.2 g. Cobalt Naphthenate Drier

*Careful temperature control for these viscosity determination was not necessary because of the small temperature-viscosity coefficient for this dilute suspension. For example, a difference of 7 deg. F. caused a variation in the Zahn reading of only 2/5 second.

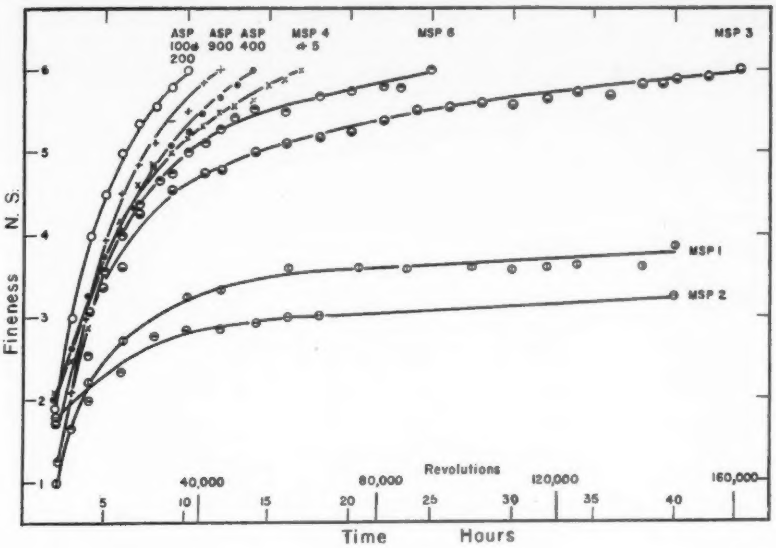


Fig. 3. Variation of fineness (North Standard Units) with time of milling.

(Ferro Chem. Co.)
4.2 g. Anti-Skinning Agent (Advance Solvents & Chemical)

mixed with the milled primer for one hour in the change-can mixer.

(5) A sample of the finished primer was diluted with 50% by volume of toluene and the viscosity of the resulting suspension determined by means of a Zahn #1 efflux cup.

Other Properties

Fineness of grind is one of the most important observations in this study. Considerable attention was devoted, therefore, to securing accurate and reproducible data. A Hegman grind gauge having a depth of 4 mils was employed. The 4 to 0 mil tapered groove was divided into 8 divisions over a 5-inch length and each of these divisions sub-divided into two equal parts. Fineness could then be read directly to the nearest half and estimated to the nearest quarter. In all cases 4 separate fineness readings were made and averaged for each determination. In many cases two readings each were obtained by two different technicians. In each series of readings values rarely varied by more than ¼ — ½ division. An article by Doubleday and Barkman[9] of the Sherwin-Williams Company was found to be helpful in developing improved grinding gauge technique.

Particle size distribution data were determined for each inert pigment according to the Casagrande hydrometer method as modified by Norton and Speil.[10] The results of these determinations are plotted as percent finer vs. equivalent spherical diameter in microns on a semi log scale in Figure 1.

Residues on #200 and #325 mesh sieves were measured on dispersed samples of each inert. These data are included in Table I. One hundred grams of pigment were dispersed in about 300 ml. of water with suitable dispersing agent and then added to the appropriate sieve. The sieve was brushed lightly with a soft camels-hair brush with a gentle stream of water flowing into it until no further particles passed through. The residue was then dried and weighed.

Microscopic examinations of each sample as received and of the residues obtained as above were made with a Bausch and Lomb research model petrographic microscope at a magnification of about 125 diameters. This was made in both transmitted and reflected light. For reflected light a Leitz Ultropak attachment was utilized. Crystals and agglomerates were measured by means of a calibrated eyepiece micrometer in which one division was equivalent to 8.1 microns.

Oil adsorptions were determined for each siliceous inert by means of the standard rub-out method.[11,12] An improved definition of the endpoint for kaolins was established in an earlier investigation.[13] Three grams of pigment were taken and oil added from a buret until the endpoint was reached. The oil employed was pure raw linseed (Spencer-Kellogg) having an acid number of 2-4 and a specific gravity of 0.934.

Results and Discussions

COMPARATIVE results on the dispersibility of aluminum silicates (kaolins) and magnesium silicates (talcs) employing the specification grinding formula are presented in Table II and Figure 3, in which fineness (North Standard Units) is plotted against time in hours. Data for only three aluminum silicates and five magnesium silicates are included in the graph because of overlapping of points and confusion in plotting. For example, curves for all seven aluminum silicates fall within a small area (between the curves for ASP 100 and ASP 400) when a scale condensed enough to include the slow grinding talcs is used. The curves for MSP 4 and 5 practically coincide so that only one is included. From Figure 3 it is seen that the slowest aluminum silicates to disperse, the coarse fraction ASP 400 and unfractionated ASP 900, reach a fineness of 6 N. S. more rapidly than the fastest grinding of the magnesium silicates, MSP 4 and 5. Two of the talcs, MSP 6 and MSP 3 required 25 and 45 hours, respectively to reach a fineness of 6. The two remaining ones, MSP 1 and 2, were at a fineness of about 4 at 40 hours of milling. Twenty-five additional hours of milling for the MSP 1 made only a slight improvement in fineness. When formulas containing these two talcs were milled 40 hours, the dispersion resin added and then milled an additional four hours a fineness of 6 resulted for MSP 1 and 5½ for MSP 2. Four hours of grinding in the dispersion resin was necessary for these two magnesium silicates, whereas one hour was necessary for the aluminum silicates. Apparently these two

magnesium silicates reach a highly flocculated state upon grinding, even in the presence of maleic anhydride, a deflocculating agent. Addition of aluminum stearate gel (100 gm.) made no difference in the fineness readings for formulas containing either magnesium silicates or aluminum silicates although an increase in final viscosity was observed with either type of inert. In most formulas in this study aluminum stearate was omitted, consequently some of the viscosities were at the lower limit (32 sec. Zahn #1), see Tables III and IV. In actual manufacturing practice, however, addition of aluminum stearate gel or other suspension aid is recommended for better control of viscosity and added can stability insurance.

No difference could be found in results obtained by the two mills. Replication within one or two hours grinding time was obtained whether the same or different mills were employed. Reproducibility is illustrated in Figures 4 & 5 in which two milling tests were made using identical formulas for each inert. Differences between average fineness determinations for different runs at a given time never exceeded one-half of a fineness unit and, in general, were within one-quarter unit.

Attention is called to the small differences in dispersibility between the various aluminum silicates. ASP 100 and 200, the fine fractionated aluminum silicates, with mean diameter of 0.6 micron, reached a fineness of 6 N.S. in 9 to 10 hours. ASP 400, the coarse fractionated aluminum silicates (kaolins) with mean particle diameter of 4.2 microns, required approximately 13 hours to reach a 6 fineness. This difference between the end members in the aluminum silicate series amounts to only four hours. The other aluminum silicates dispersed at a rate intermediate between these. The rate for ASP 500 and HT (S), the intermediate fractionated kaolins with mean particle diameter of 0.8 micron, was almost the same as that for the fine fractionated products, being about 10 hours/6 N.S. The unfractionated aluminum silicate, ASP 900, with mean particle size of 1.6 microns, required 12 hours/6 N.S. Fine fractionated aluminum silicate coated with 0.5% stearate, ASP 1100, reached a fineness of 6 N.S. in 10, 11 and 12 hours on three successive determinations. The formula for the last of these determinations contained 100 gm of aluminum stearate gel. This further addition of stearate did not appear to improve dispersibility in this particular vehicle.

The comparison in dispersibility between aluminum and magnesium silicates is further depicted in Figure 6 in which bar graphs giving the comparative quantities ground per hour are shown. When the Flow Point method is followed, the time of dispersion is greatly reduced (see Table IV) and comparative units ground per hour are much higher. A comparison of results obtained by the two methods is illustrated in Figure 7. It should be noted, however, that the comparative ease of dispersion of the aluminum silicates over the magnesium silicates remains about the same when a grinding formula of either high or low efficiency is employed.

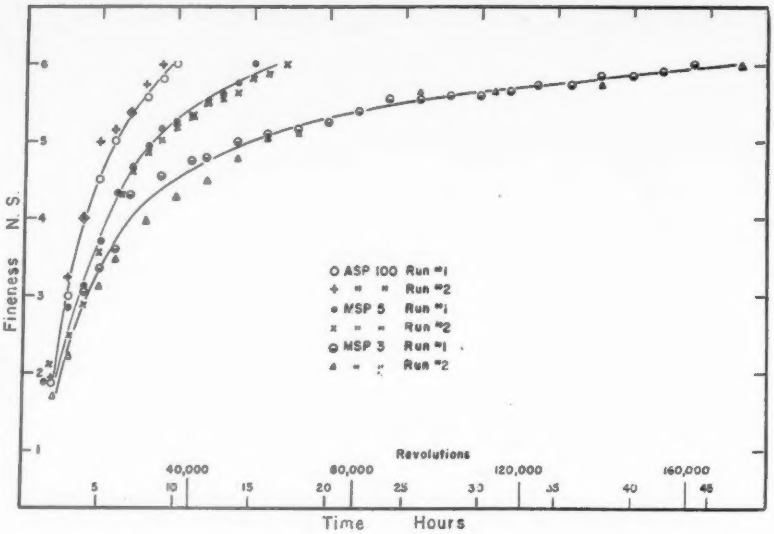


Fig. 4. Variation of fineness determinations with time for two different millings of the same formula (Control formula, Specification MIL-P-6889A) is clearly shown in above chart.

Fig. 5 Variation of fineness determination with time for two different millings of the same formula (Daniel Flow Point Method for zinc chromate primer) is given in above chart.

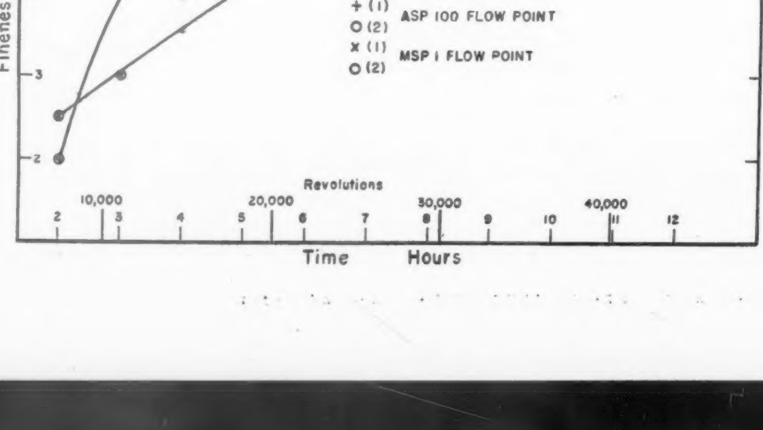


Table III

MILLING DATA ON STUDY OF ALUMINUM AND MAGNESIUM SILICATES MADE ACCORDING TO GRINDING FORMULA FOR ZINC CHROMATE PRIMER, SPECIFICATION MIL-P-6889A

INERT	TEST NO.	MILL NO.	FINENESS N.S. (Ave. of 4 Readings)	TIME OF MILLING (Hours)	STORMER VISC. BEFORE LET-DOWN (KU)	VISC. DILUTED 50% TOLUENE SEC. ZAHN #1
ALUMINUM SILICATES						
ASP 100	1	2	6	10	54 (81°F)	32.2 (81°F)
	2	1	6	9	57 (79°F)*1	32.8 (81°F)*1
ASP 200	1	1	6-1/8	9	57 (69°F)	32.2 (72°F)
	2	1	6	10	58 (72°F)	32 (75°F)
ASP 400	1	1	6-1/16	12	57 (71°F)	32 (71°F)
	2	2	6	14	54 (82°F)	33.8 (74°F)
ASP 500	1	2	6	10	57 (75°F)	31.8 (76°F)
HT(S)	1	1	6	10	57 (69°F)	33.2 (72°F)
ASP 900	1	2	6-1/16	11	56 (79°F)	32.2 (79°F)
	2	1	6-1/16	13	55 (77°F)	32.2 (81°F)
ASP 1100	1	1	6	10	57 (81°F)	31.8 (74°F)
	2	2	6	11	56 (74°F)	33.2 (77°F)
	3	2	6-1/16	12	63 (77°F)*1	32.4 (77°F)*1
MAGNESIUM SILICATES						
MSP 1	1	1	4-1/2	65	55 (80°F)	-- --
	2	1	4-3/4	40*2	55 (75°F)	33.2 (76°F)
	3	2	4-1/8	40*3	56 (77°F)	32.4 (77°F)
	4	2	4	40*4	60 (77°F)*1	36 (77°F)
MSP 2	1	1	6	15	55 (72°F)	31.8 (81°F)
	2	2	6	17	55 (74°F)	34.2 (74°F)
MSP 3	1	2	6	44	80 (77°F)	34.8 (78°F)
	2	1	6	47	97 (67°F)	34.2 (70°F)
MSP 4	1	1	6	16	55 (79°F)	32.6 (69°F)
	2	1	6	17	60 (70°F)	34 (77°F)
MSP 5	1	2	6	25	60 (73°F)	32.2 (74°F)
MSP 6	1	2	3-1/4	40*5	56 (77°F)	33 (77°F)

*1 With Aluminum Stearate Gel
*2 Plus 4 hours in dispersion resin - fineness 7
*3 Plus 6 hours in dispersion resin - fineness 6
*4 Plus 4 hours in dispersion resin - fineness 6
*5 Plus 4 hours in dispersion resin - fineness 5-1/2

Table IV

MILLING DATA FOR FLOW POINT FORMULAS FOR ZINC CHROMATE PRIMER, MIL-P-6889A CONTAINING ALUMINUM AND MAGNESIUM SILICATES

INERT	TEST NO.	MILL NO.	FINENESS N.S. (Ave. of 4 Readings)	TIME OF MILLING (Hours)	STORMER VISC. BEFORE LET-DOWN (KU)	VISC. DILUTED 50% TOLUENE SEC. ZAHN #1
ASP 100	1	1	7	6-1/2	72 (74°F)	32.2 (74°F)
	2	1	6	6	71 (78°F)	31.2 (75°F)
ASP 200	1	1	6	6	79 (77°F)	34.6 (77°F)
ASP 400	1	1	6	6	68 (84°F)	31.6 (77°F)
ASP 900	1	2	6	7	71 (81°F)	31.6 (75°F)
MSP 1	1	1	6	12	74 (74°F)	34.6 (74°F)
	2	2	6	12-1/2	72 (80°F)	32.2 (67°F)
MSP 5	1	1	6	15	89 (76°F)	32.2 (77°F)
MSP 6	1	1	6	12	81 (68°F)	35.6 (77°F)

ASP 400 has the lowest vehicle requirement of any siliceous inert tested. The Flow Point formula calculated on this basis thus has the highest solids content — 1.70 times that of the control grinding formula. From the chart it is seen that ASP 400 is the slowest of the aluminum silicates to disperse in the control formula but is among the fastest in the Flow Point formula. The Flow Point determinations show that the control formula as set forth in the specification is farther from optimum grinding conditions for ASP 400 than for any other of the inerts included in this investigation.

MSP 1 has lower vehicle requirement than either MSP 5 or 6 and parallel to ASP 400 among aluminum silicates. Compared to other talcs tested it presented the most dispersion problem in the control formula.

In mills where appreciable temperature rises occur during operation it is probable that reduction in viscosity of the vehicle might alter the Flow Point. In this case even more efficient grinding might be expected at slightly higher solids contents than called for in the Flow Point determinations.

Data on particle characteristics, residues, oil adsorption, etc., are also included in Table I. Both the mean particle diameter and screen residues, with the lone exception of the residue for MSP 4, are much higher for the magnesium silicates than those for the aluminum silicates. The mean particle diameter (not considering material coarser than 325 mesh, i.e., above 44 microns) for the magnesium silicates range from 5.9 to 10.8 microns, whereas those for the aluminum silicates range from 0.6 to 4.2 microns. Particle size distribution curves illustrate the fact that the finest magnesium silicate (talcs) is coarser than the largest sized aluminum silicate (kaolins) studied. It should be considered, however, that the particle size curves are plotted with size expressed as equivalent spherical diameter. Actually, the talcs are composed of either fibrous, platy, or mixtures of fibrous and platy particles with some granular material also usually present. Thus, microscopic observations of MSP 6 revealed a high concentration of laminar

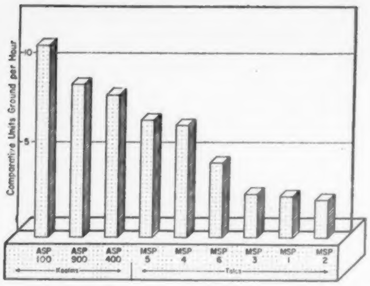


Fig. 6. Comparative units ground per hr. for aluminum and magnesium silicates using formula for zinc chromate primer MIL-P-688 9A.

particles larger than 20 x 20 microns but considerably thinner than 20 microns, while a mean spherical diameter of 5.9 microns was obtained by sedimentation methods. MSP 3, which gave the largest mean spherical diameter, 10.8 microns, is also a platy talc. Microscopic measurement revealed that these plates were considerably larger than those for MSP 6. A high proportion of plates from 40 to 75 microns was revealed. This was verified by the screen analysis in which a residue of 13.64 percent on 325 mesh was found, the highest residue of any inert tested.

Certain of the magnesium silicates (talcs), MSP 1 and 2, contained fibrous material (probably asbestos) as much as 250 microns in length with a length to width ratio of about 100 to 1. Bundles of fibers up to 500 microns in length were measured for MSP 2. Shorter fibers with a much smaller length to width ratio, about 5 to 1, were observed for MSP 5, although a few of the needle-like crystals were also present. The MSP 4 was the finest of the magnesium silicates giving a distribution curve similar in shape to that for the coarse fraction aluminum silicate, ASP 400.

It is interesting to compare the residues obtained for the aluminum silicates to those for the magnesium silicates both as to amount and composition. Residues on a #325 mesh sieve ranged from 0.01 to 0.05 percent for the ASP's as compared to 0.03 to 13.64 percent for the talcs. Obviously, considerably more time will be required to grind this coarser (minimum size 44 microns) material to a fineness of 6 N/S. (maximum size 25 microns).

The residues for the aluminum silicates are composed chiefly of agglomerates or "pinheads" including many kaolin particles lightly cemented together. It is, of course, easier to break up and disperse these agglomerates than to reduce single crystals of the same size. The crystal shape of the aluminum silicates contributes appreciably to their pronounced ease of dispersion. In the case of ASP 100, 200, 500, and 1100 and HT(S) the particles are individual platelets shaped like irregular hexagons. The ratio of length to width is between 10 and 12 to 1. During the milling operation these particles have higher resistance to rotation along two axes in the fluid medium with resulting higher shearing forces at the flat faces. This facilitates separation of the platelets from one another. In the case of a needle-like particle, resistance to rotation is greatest along only one axis. In addition such fibrous crystals tend to interlock or matt with resulting resistance to dispersion.

It is of interest to compare values of oil adsorption for the siliceous inerts to the Flow Point requirements (15% solids Aroplaz 1365-Xylene solution). Both values are expressed as lbs. of liquid per 100 lb. of pigment. Obviously, the liquid requirement for the Flow Point is higher because of the higher fluidity of the paste at this end-point. It is very significant to note that although the oil adsorptions for the magnesium silicate (talcs) are all lower than those for the aluminum silicate (kaolins) the Flow Point requirements are, in general, considerably higher than corresponding values for the aluminum silicates. It would appear, therefore, that the Flow Point requirement established with the particular vehicle-thinner employed in each formulation is more meaningful than oil adsorption.

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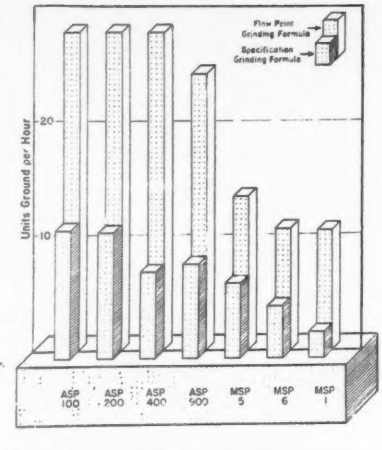

Fig. 7. Comparison for units ground per hr. by Daniel Flow Pt. method and control grinding formula for zinc chromate primer MIL-P-6889-A for aluminum and magnesium silicates.

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(2) There is little difference in dispersibility between different grades of aluminum silicates.

(3) The dispersibility of commercial magnesium silicates in Zinc Chromate Primer 6889A varies over wide limits. As a group aluminum silicates dispersed more readily than magnesium silicates.

(4) Apparent causes for the better dispersing properties of the aluminum silicates over magnesium silicates include lower contents of over-sized (plus 325 mesh) particles, smaller average sizes below 325 mesh, and the characteristic platelet particle shape of the aluminum silicates examined.

(5) The Flow Point method for establishing optmum milling formulas is effective in increasing milling efficiency, i.e. reducing milling time. The Flow Point requirement for a pigment based on the particular grinding vehicle employed is more significant than its oil adsorption values.

(*Turn to page 70*)

A Quick View of the Raw Materials Situation

OILS

Linseed — Sale of approximately 190 million pounds of oil by Commodity Credit Corp. will assure adequate supplies for next 12 months.

Tung — Domestic production of 35 million pounds during 1952 and imports from South America should provide a total available supply of about 71 million pounds, an increase of about 10 million pounds over last year. The price should dip slightly.

Castor — Supplies are expected to be less this year since most of the Brazilian crop is being used locally. Government stockpiling will continue for some time, but it is expected that supplies should be sufficient to meet reasonable demands.

Soybean — Supply of soybean oil will be adequate to meet all demands from the paint industry after satisfying the needs of the edible industry and exports. The government supported program and tendency of producers to hold for higher prices may create an artificial shortage which could result in higher prices.

Fish Oil — There are ample stocks to meet the needs of the protective coatings industry. The amount of menhaden oil which will be available is a question since it is not known how much of this oil will be exported. Sardine oil stocks are expected to be considerably low since last year's sardine fishing on the west coast has been very poor.

Oiticica Oil — Consumption of this oil has increased greatly during 1952, since its price was considerably below Tung oil. Supplies of this oil is expected to be spotty since very little is known about the incoming crop.

This feature is based on authoritative opinions secured by the National Paint, Varnish and Lacquer Association which was presented in their Pre-Convention Raw Material Survey prior to the 64th annual convention in Chicago, November 1952.

PIGMENTS

Titanium — With completion of new production facilities during late 1951 and early 1952, supply of this important pigment will be in excess of demand. It is believed that there are sufficient facilities to meet requirements through 1954. Since there appears to be no danger of shortages in sulfuric acid or other raw materials, the supply of titanium pigments indeed looks bright.

Lead — Supply will continue to be adequate to meet all requirements. Long term outlook is bright because domestic lead reserves in the ground have increased in recent years in spite of heavy consumption during and since the war.

Zinc — Stock of lead-free zinc oxide, as reported by the Bureau of Mines, have declined since early 1952. However, supply has been adequate and if demand should increase, production could easily be stepped up to satisfy it. Lithopone is considered in fair supply, and stocks of zinc sulfide appear to be ample.

Inerts — There seems to be plenty of talc, clay and calcium carbonate available. Latex paints have created a demand for inerts having lower soluble salts. Due to a strike, diatomaceous earth has been in very short supply, but by reformulation, paint manufacturers were able to get along.

COLORS

Lead Chromate — In this group are included chrome yellows and oranges, chrome greens, and molybdate oranges. All of these pigments are in good supply. Barring any interference from Government stockpiling program of chrome ore which is imported from South Africa, there should be sufficient amounts of sodium bichromate to insure adequate production of these pigments to meet all needs. Molybdenum is still under allocation. This material is used in the manufacture of molybdate chrome orange, but there seems to be adequate amount of this strategic material to provide ample production of molybdate pigments.

Chrome Pigments — (Chrome oxide, hydrate chromium oxide) — The supply of these pigments is dependent on sufficient supply of sodium bichromate, which is considered fairly good at the present time. However, the National Association points out that a large camouflage program could create a temporary shortage of chromium oxide.

Iron oxides — Expansion facilities for producing synthetic iron oxides has been under way and this increase in production should provide ample supplies of this pigment.

Other Inorganic Colors — No supply problem is foreseen with zinc chromate, iron blues and cadmium colors. Tungstated colors are still prohibited for use in paints but there is reason to believe that NPA may amend the current order so that their use will be permitted in paints and lacquers.

Organics — This class of pigments is generally considered to be in good supply. Production of basic coal tar chemicals are continuing at a high level to insure adequate raw materials for the synthesis of these pigments.

SOLVENTS

Alcohol Derivatives — Alcohol derivatives are in good supply and should remain as such for some time.

Petroleum Solvents — Supply of all grades of aliphatic napthas is excellent in spite of the fact that demand for aviation jet fuel is increasing and this product also utilizes straight-run distillates

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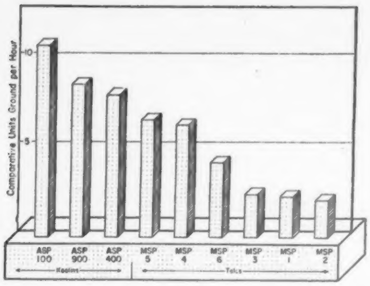

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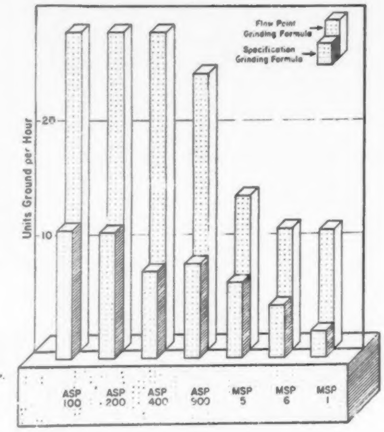

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Fish Oil — There are ample stocks to meet the needs of the protective coatings industry. The amount of menhaden oil which will be available is a question since it is not known how much of this oil will be exported. Sardine oil stocks are expected to be considerably low since last year's sardine fishing on the west coast has been very poor.

Oiticica Oil — Consumption of this oil has increased greatly during 1952, since its price was considerably below Tung oil. Supplies of this oil is expected to be spotty since very little is known about the incoming crop.

This feature is based on authoritative opinions secured by the National Paint, Varnish and Lacquer Association which was presented in their Pre-Convention Raw Material Survey prior to the 64th annual convention in Chicago, November 1952.

PIGMENTS

Titanium — With completion of new production facilities during late 1951 and early 1952, supply of this important pigment will be in excess of demand. It is believed that there are sufficient facilities to meet requirements through 1954. Since there appears to be no danger of shortages in sulfuric acid or other raw materials, the supply of titanium pigments indeed looks bright.

Lead — Supply will continue to be adequate to meet all requirements. Long term outlook is bright because domestic lead reserves in the ground have increased in recent years in spite of heavy consumption during and since the war.

Zinc — Stock of lead-free zinc oxide, as reported by the Bureau of Mines, have declined since early 1952. However, supply has been adequate and if demand should increase, production could easily be stepped up to satisfy it. Lithopone is considered in fair supply, and stocks of zinc sulfide appear to be ample.

Inerts — There seems to be plenty of talc, clay and calcium carbonate available. Latex paints have created a demand for inerts having lower soluble salts. Due to a strike, diatomaceous earth has been in very short supply, but by reformulation, paint manufacturers were able to get along.

COLORS

Lead Chromate — In this group are included chrome yellows and oranges, chrome greens, and molybdate oranges. All of these pigments are in good supply. Barring any interference from Government stockpiling program of chrome ore which is imported from South Africa, there should be sufficient amounts of sodium bichromate to insure adequate production of these pigments to meet all needs. Molybdenum is still under allocation. This material is used in the manufacture of molybdate chrome orange, but there seems to be adequate amount of this strategic material to provide ample production of molybdate pigments.

Chrome Pigments — (Chrome oxide, hydrate chromium oxide) — The supply of these pigments is dependent on sufficient supply of sodium bichromate, which is considered fairly good at the present time. However, the National Association points out that a large camouflage program could create a temporary shortage of chromium oxide.

Iron oxides — Expansion facilities for producing synthetic iron oxides has been under way and this increase in production should provide ample supplies of this pigment.

Other Inorganic Colors — No supply problem is foreseen with zinc chromate, iron blues and cadmium colors. Tungstated colors are still prohibited for use in paints but there is reason to believe that NPA may amend the current order so that their use will be permitted in paints and lacquers.

Organics — This class of pigments is generally considered to be in good supply. Production of basic coal tar chemicals are continuing at a high level to insure adequate raw materials for the synthesis of these pigments.

SOLVENTS

Alcohol Derivatives — Alcohol derivatives are in good supply and should remain as such for some time.

Petroleum Solvents — Supply of all grades of aliphatic napthas is excellent in spite of the fact that demand for aviation jet fuel is increasing and this product also utilizes straight-run distillates

(Turn to page 68)

P&V NEW PRODUCTS & IMPROVEMENTS

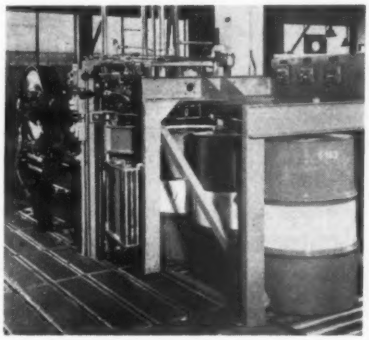
A MONTHLY MARKET SURVEY

This section is intended to keep our readers informed of new and improved products. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.

DRIERS

Low Odor

These driers which have been designed for preparing odorless finishes offer excellent stability, uniformity may be used alternately on equal basis with driers of similar strength. These driers are available for immediate shipment. For complete information write to The Harshaw Chemical Co., Cleveland 6, Ohio.



RUCKER

DRUM FILLER

Automatic

Automatic drum filler for oils and other liquids, capable of filling 1,000 drums of 53 - 55 gal. capacity per eight-hour shift with a single operator, according to the manufacturer.

Empty drums are fed to the unit by gravity roller conveyor. The filler admits one drum at a time, automatically locates the bung and positions the drum. Wide variations in drum heights, diameter and bung locations can be accommodated. A filling lance descends through the open bung, automatically opening the filling valve at the bottom of the stroke. Filling is done "from the bottom up", with the lance tip submerged to minimize foaming and static spark. A dial scale, pre-set to the desired net filling weight, automatically compensates for the tare weight of the drum and provides automatic cut-off when the pre-set net weight is reached. For complete data, write to the Rucker Co., 4228 Hollis St., Oakland 8, Calif.

MAGLINE

BARREL SKID
All-Magnesium

Of welded construction throughout, the barrel skid is fabricated of magnesium, and combines light weight and ease of handling, with certified, capacity-rated strength. According to the manufacturer, the new unit speeds the handling of drums and barrels, reduces the risk of lifting injuries, and assures greater safety to men and equipment. The skids are available in standard sizes, ranging from 5 feet to 18 feet in length. Special sizes are also manufactured. Magline Inc., Mercer St., Pinconning, Mich.

RARE EARTH LIQUID
For Curing Epoxy Resins

Uversol Rare Earth Liquid 4% is a useful adjunct to conventional driers, especially with straight epoxy resins or resin blends of the high bake type.

According to the manufacturer, advantages include faster curing rate, less discoloration, increased film hardness and enhanced toughness. These effects are believed to be due to the special action of the cerium and lanthanum soaps, possibly acting as a promoter or cross linkage catalyst (by chelating formation). Certain observations indicate partial replacement of active driers, such as cobalt, as well as shortened baking schedules. The Harshaw Chemical Co., Cleveland 6, Ohio.

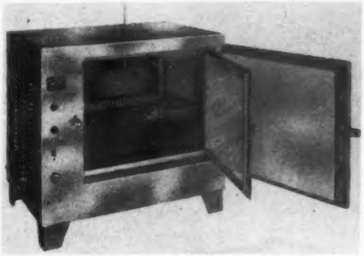
GELLING AGENT
No Heat Needed

Raybo 77-AlGel is said to eliminate the need of heat in the production of aluminum octoate gel structures in petroleum products. This avoids the hazard of an open fire in a paint plant. Uses for aluminum octoate gel are: suspending agent for paints, viscosity producer for paints and allied products, flow retarder, and to reduce penetration of films on porous surfaces. 1½ to 2% of this material is sufficient to bring about gel formation, Raybo Chemical Co., 1120 Chester Ave., Cleveland, Ohio.

POLYVINYL ALCOHOLS
Non-Gelling

Two standard fully hydrolyzed grades available: one medium and other high viscosity. These are recommended in manufacturing adhesives, and grease-proof finishes and coatings deposited from water solution of the resin. According to the manufacturer, these materials are non-gelling, white, free flowing, and fast dissolving. Vinol FH-400 is medium viscosity grade and Vinol FH-500 is the high viscosity type. Harwick Standard Chemical Co., 60 Seiberling St., Akron 5, Ohio.

NEW PRODUCTS



BLUE M

CABINETS
For Temp.-Humidity Tests

Unit is used in tests (ASTM) involving 90-100% relative humidity at from 4 deg. C (30.2 F) up to 70 deg. C (158F) dry bulb temperature. Counterflow baffle promotes and maintains a direct and vigorous chamber atmosphere circulation while saving on cooling water when testing at temperatures below ambient temperature. Unit is provided with an automatic hydraulic electric thermostat which provides sensitivity of ½ deg. C. Blue M Electric Co., 306-08 W. 69th St., Chicago 21, Ill.

PLASTICIZERS
New Uses in Lacquers

New Claims have been made by the manufacturer regarding two new plasticizers, Pycal 70 and Pycal 76. These are:

Pycal 70 gives faster initial build-up to good print resistance, and produces a hard film in less time by comparison with other types of plasticizers. It also provides excellent cold-check resistance. Lacquers formulated with this plasticizer possess better sanding qualities, ease of polishing and gloss than those made with the accepted commercial plasticizers tested.

Pycal 76 test data indicates that this product gives properties essentially equal to those imparted by other plasticizers at considerably lower cost. It is not recommended for finishes in which a high degree of ultra-violet light resistance is required. Atlas Powder Company, Wilmington, Delaware.

YOU GET MORE-

IN STEEL CONTAINERS MADE BY CONTINENTAL..

you get the <u>engineering</u> <u>skill</u> of a <u>full-line</u> container manufacturer

The sleek, streamlined appearance of Continental steel containers tells you that they were designed by men with a packaging expert's eye for good looks, as well as an engineer's interest in utility.

And the way these containers take the battering and bouncing of transcontinental shipping is evidence of the solid durability that has been designed into them.

So even though you may never need to call upon our packaging engineers for help with a special packaging problem, you get the benefits of their designing and production skill in every Continental steel container you use.

Included in the Continental line are lug cover pails, utility cans, flaring pails, and closed head drums in light and heavy gauge. Chances are one of them is just right for your product. We'll be glad to talk over your packaging problem, and suggest a container exactly suited to your needs.

CONTINENTAL CAN COMPANY

CONTINENTAL CAN BUILDING

100 East 42nd Street New York 17, N. Y.

Eastern Division: 100 E. 42nd St., New York 17 • Central Division: 135 So. La Salle St., Chicago 3 • Pacific Division: Russ Building, San Francisco 4

NEWS DIGEST

A guest-appearance television program prepared by American Can Company, which reviews the progress of containers and packaging, is being shown over leading TV stations. The most recent in a continuing series of Canco programs was broadcast over the WNBT "Herb Sheldon Show" (above) in New York. C. E. McDougall (left) of the can company's general sales office, shows the "double-tite" paint can to Mr. Sheldon. Containers with distinctive product labels are used as props as an effective means of illustrating the evolution and importance of "containers that help people live better." Enlarged "then and now" photographs are also used in presenting the progress of can making and packaging during the past century

Glycerine Producers' Assoc. To Hold Meeting January 28

Glycerine Research Awards, established for the first time this year, will be given at the Annual Meeting of the Glycerine Producers' Association to be held January 28, at the Waldorf Astoria Hotel, New York.

The meeting is being held as part of the Annual Convention of the Association of American Soap and Glycerine Producers, Inc., which will be held January 27 to 29.

The Awards, to be given annually, are designed to encourage research for the wider application of glycerine to industrial and consumer fields.

An honor plaque carrying a cash stipend of $1000 and two honor certificates with cash stipends of $300 and $200 respectively, make up the awards.

Judges for the awards are: Sidney Kirkpatrick, Editorial Director of the McGraw-Hill Chemical Engineering Magazine; R. T. Milner, Director of the Northern Regional Research Laboratory, and Roy Kienle, Director of Application Research for American Cyanamid Company.

The awards will be presented by Dr. John W. Bodman, Technical Adviser to the Board of Directors of Lever Brothers Company and Chairman of the Research Committee of the Glycerine Producers' Association.

Included in the program will be a panel, made up of representatives of producers and refiners, on how yields and quality of crude glycerine can be improved.

Also scheduled at the meeting is a talk by Ralph S. Heller, Technical Superintendent of the Olin Cellophane Division, on the application of glycerine as a plasticizer in cellophane and other cellulose wrapping materials.

•

Talk on Alkyd Manufacture Trends To Be Given at N.Y. University

A talk on *"The Latest Advances and Trends in Alkyd Manufacture,* will be given by Benjamin Farber of the Farnow Varnish Works at New York University's Washington Square school, on January 13, 8:10 p.m. in room 1001B in the main bldg.

Mr. Farber's talk will be part of the University's seminar, "New Developments in Organic Finishes," being given under the direction of Dr. Myron Color, Elias Singer and Sidney Laurin.

Eagle-Picher Discontinues Its Paint & Varnish Division

The Eagle-Picher Company, Cincinnati, Ohio, announced recently that it would discontinue its Paint and Varnish Division and no longer manufacture and sell white lead-in-oil, red lead-in-oil, pure white lead paint, ready mixed paint, varnish and enamels.

A company spokesman said the move was made to strenghten Eagle-Picher's position as a supplier of raw material to manufacturer. He said several moves had been made in the past year toward this objective.

A four million dollar investment in a sulphric acid, zinc roasting, and sintering plant was cited by the spokesman.

In addition, a company report announced in July, that Eagle-Picher had purchased for about eight million dollars almost all the common stock of the Ohio Rubber Company.

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John R. MacGregor, Paint Industry Leader, Dies at 69

John R. MacGregor, president of the John R. MacGregor Company Lead Company, died December 15 after a brief illness. He was 69.

Mr. MacGregor had delivered the Mattiello lecture at the Annual Meeting of the Federation of Paint and Varnish Production Clubs held in November.

He was born in Park Hill, Ontario, Canada, June 11, 1883 and began his career in the paint industry in 1903 with the Detroit White Lead Works.

In 1905, Mr. MacGregor was made chief chemist and dry color superintendent for the company, which position he held until 1909. He joined the Eagle-Picher Company that year.

He was associated with Eagle-Picher until 1937, rising to the vice presidency. Mr. MacGregor resigned that year to start his own firm.

Very active in paint trade association affairs, Mr. MacGregor was president of the Paint, Oil, and Varnish Club of Chicago in 1926, and was chairman of the Joint-Committee of the American Paint and Varnish Manufacturers' Association and on the Celebration of Chicago's One Hundredth Anniversary in 1927. He was also, for a time, chairman of the National Association.

Mr. MacGregor was one of the organizers and the second chairman of the Paint and Varnish Division of the American Chemical Society and also an active member of the Committee D-I of the American Society for Testing Materials.

•

Talk on Dehydrated Castor Oil To Be Given at Vehicle Meeting

A talk on "Dehydrated Castor Oil," by R. Terrill of Spencer Kellogg, will be given at the first 1953 meeting of the Vehicle Group of the New York Paint, Varnish and Lacquer Association,

The meeting will be held at the Hotel Brevoort, January 14, at 7 p.m.

Mr. C.P. Muller of the National Lead Company, vice-chairman of the Vehicle Manufacturers Committee announced that he would have a series of guest speakers at Association meetings to talk on the various aspects of vehicle research development and manufacture.

NEWS DIGEST

Talk on Roller Mills Features New England Club Meeting

A talk on "The Modern Roller Mill as a Paint Dispersion Tool" highlighted the November 25 meeting of the New England Paint and Varnish Production Club held at the Hotel Puritan.

C. B. Hoffman, of the J. M. Lehmann Company, gave the talk in which he reviewed the advantages and limitations of the principal improvements that have been built into roller mills in the last four or five years.

Mr. Hoffman, who was guest speaker at the meeting, was introduced by the Club's vice president Harold S. Ellsworth.

Dr. Alan R. Lukens, reporting for the Educational Committee, announced plans for the non-technical paint lecture course which will begin January 6. A talk by Dr. J. S. Long on "Protective Coatings, Their Purpose and History," will precede the course.

•

Chemical Firm Moves Headquarters to Huntington, West Virginia

The Raybo Chemical Company have moved their headquarters from Cleveland, Ohio to Huntington, West Virginia, according to a company release.

Research and production facilities has been established at Huntington some time ago. The move was made to consolidate customer service by concentrating the entire operation at one location, the release said.

Bertram A. Wilkes

Cabot Opens New Sales Office At New Brunswick, New Jersey

Godfrey L. Cabot, Inc., Boston, Mass. has announced the opening of a new sales office located in the Citizens' Building, 40 Bayard St., New Brunswick, N. J.

The new office will serve Cabot customers in the New Jersey, Delaware, Maryland, Pennsylvania and Virginia areas.

Bertram A. Wilkes will head the office. He has been a member of the firm since 1929 and has served Cabot customers in this area for 15 years.

Charles R. Schroth, formerly of the H. N. Richards Company, Trenton, N.J., will be on the sales staff of the New Brunswick office.

•

Increase in Tall Oil Production Foreseen by Industry Spokesman

Increased use of Tall Oil in the paint and varnish, soap and other industry, indicates a continuance in the next ten years, of the upward trend in production and sales of the product established in the 1941 to 1951 period, according to A. E. Griffin, sales manager of the Chemical Division, Camp Manufacturing Company.

Mr. Griffin expressed the view in his address at the Naval Stores Breakfast, November 18, at the Annual Convention of the Paint, Varnish & Lacquer Association in Chicago.

He attended the Convention as a representative of the Southern Pulp & Paper Industry.

According to industry reports, production of Tall Oil, an important byproduct of sulphate pulping, expanded from 27,000 tons in 1941 to 199,000 tons in 1951. Sulphate turpentine recovery rose in that period from 65,000 barrels to 203,000 barrels.

NEWS DIGEST

Sherwin-Williams Plant Heads Discuss Production Problems

Operating heads of the Sherwin-Williams Company plants gathered in Cleveland recently for discussion of technical and production problems.

Among the managers of manufacturing and general superintendents who met in Cleveland are: G. G. Daley, Montreal; M. W. Hurdelbrink, Cleveland; J. R. Ferree, Los Angeles; W. R. Currens, Dallas; W. A. Miller, Chicago; J. A. Hutchinson, Detroit; C. S. Hollinger, Gibbsboro; W. O. Michaels, Oakland; Victor Mills, general manager of paint, varnish and lacquer manufacturing, Cleveland; Lloyd Kautz (pinch-hitting for Carl Sturmer), Newark; and E. W. Fasig, Dayton.

Sherwin-Williams Operating Heads Meet to Discuss Production Problems.

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Hiram P. Ball Appointed Trustee of Franklin and Marshall College

Hiram P. Ball, former president of the Federation of Paint and Varnish Production Clubs, has been elected to the Board of Trustees of Franklin and Marshall College, according to a recent announcement by Dr. Theodore S. Distler, president of the college at Lancaster, Pa.

Mr. Ball graduated from Franklin and Marshall in 1937, and later attended the Harvard Graduate School of Business Administration at Cambridge, Mass.

Secretary and treasurer of the Ball Chemical Company, Mr. Ball has made many contributions to the protective coatings industry and the Federation of Paint and Varnish Production Clubs.

He was president of the Pittsburgh PVPC in 1945, and continued through practically all of the important committee chairmanships in the Federation culminating in his election to the presidency in 1952.

•

Naval Stores Firm To Build Tall Oil Plant in Alabama

Newport Industries, Inc. will build a plant at Bay Minette, Alabama, for extracting oils from Kraft paper mill waste, according to D.E. Bushnell, superintendent of the firm.

Mr. Bushnell said the new plant was scheduled for completion in the spring of 1954.

"The plant will process black liquor skimmings and crude tall oil from Kraft paper plants in the South, he said.

NEWS DIGEST

Postpone to January 30, Revised Paint and Varnish Regulations

The mandatory effective date of the revised manufacturers' paint, varnish and lacquer regulation, SR 6, revision 1 to CPR 22, was postponed recently until January 30, 1953, by the Office of Price Stabilization.

Because of typographical errors in one of the filing forms and in the text of the regulation governing the calculation of ceiling prices, amendments No. 2 and 3 to the regulation were issued to correct the errors and to extend the filing date to December 15, 1952.

However, the OPS felt that the December 15 deadline was not adequate

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J. J. Crowley of O'Brien Dies

Jerome J. Crowley, Sr., 75, chairman of the board of The O'Brien Corporation, died in his home in Chicago, on December 19th.

Mr. Crowley was a graduate of the University of Notre Dame and the University of Michigan Law School in Ann Arbor. He practiced law in Chicago for more than fifty years as a member of the firm of Barry and Crowley. He was a director of the Catholic Charities of Chicago and a vice supreme master of the fourth degree of the Knights of Columbus.

•

Witco Announces Death of T. J. Starkie, Vice Pres.

Thomas J. Starkie, vice president, director and member of the executive committee, and director of Witco Chemical Co., Ltd. died on December 21, 1952.

Mr. Starkie began his career in the chemical field with Harshaw Chemical Company and joined Witco in June, 1921. His club memberships included the Uptown Club, the Chemist's Club, the Salesman's Association of the American Chemical Society and the New York and National Paint.

•

Morris Paint's New Plant Will Boost Output 25 Per Cent

Leo Sophir, President of the Morris Paint and Varnish Company, announced recently that the new addition to the firm's plant at East St. Louis, Ill., would increase production approximately 25 per cent.

According to George Claytor, vice president in charge of production, the new plant is operating at full capacity.

Clarence E. Kinney, Naval Stores Industry Executive, Dies at 76

Clarence E. Kinney, former assistant to the director of operations of the Naval Stores Department of the Hercules Powder Company, Wilmington, Del., died November 25. He was 76.

Prominent for many years in the naval stores industry, Mr. Kinney joined the Cadillac Rosin and Turpentine Company of Cadillac, Mich., upon graduating from the University of Michigan with a degree in chemical engineering in 1905.

After working for several firms in the naval stores products field he joined Hercules in 1921.

Mr. Kinney served as manager of naval stores technical service, working directly with the director of sales, until 1939, when he was named assistant to the director of operations. He held this post until his retirement in 1945.

Mr. Kinney was a member of the American Chemical Society, Technical Association of Pulp and Paper Industry, and the American Society of Testing Materials.

•

Paint Company's Chief Chemist Completes 15th Year As Employee

Anton G. Carr, Chief Chemist of the National Lacquer and Paint Co., Chicago, completed his fifteenth year with the firm October 29, according to a company report.

Mr. Carr was honored at an informal party in the general offices, and was presented with a camera by Paul A. Meyer, President and General Manager, of National Lacquer.

Personnel Changes

DEWEY AND ALMY

Hugh S. Ferguson has been elected president and chief executive office, replacing Bradley Dewey, who was elected chairman of the board of directors. Mr. Ferguson has been with the firm for 28 years. He was elected a director of the company in 1927, treasurer and general manager in 1930 vice president in 1944 and executive vice president in 1948. Mr. Ferguson has played a part in the planning, design and organization of Dewey and Almy's factories and has travelled extensively in connection with the firm's foreign operations.

Hugh S. Ferguson

STANDARD PAINT

Robert C. Aiken has been appointed general sales manager, transferring from the Rinshed-Mason Company which recently purchased Standard. He had been assistant automotive-industrial finishes sales manager at R-M. Prior to his R-M affiliations, he was with the Sherwin-Williams Company where he served successively as credit manager, in maintenance finish sales, and automotive refinishing and industrial finish sales.

INNIS, SPEIDEN

Malcolm D. Sanders has been named executive vice president and will be responsible for the sales program. Mr. Sanders, also a director of the company, previously had been assistant to the president of Berkshire Chemicals, Inc., and its affiliated company, the Hamilton Laboratories, Inc. Before joining Berkshire Chemicals, he was a vice president and director of Gallohur Chemical Co., Inc., for three years. Previously, Mr. Sanders had been with Antara Products, division of General Aniline & Film Corp., in a sales capacity.

HEYDEN

W. H. Spreen has been appointed Midwestern District Sales Manager with headquarters at Heyden's Chicago Branch office. He has been manager of Heyden's Detroit, Michigan branch office since 1945.

ATLAS POWDER

Dixon Van Winkle has been appointed special sales assistant in the Sales Division of the industrial chemicals department. Mr. Van Winkle, who was formerly eastern general manager for the Julius Hyman Company, will correlate sales efforts in specific fields of sorbitol usage.

Arthur F. Quinlan has been assigned as technical sales representative in the industrial chemicals department. He will service customers in northern and western New York.

Maurice A. Ponti has been made technical sales representative in the industrial chemicals department. He will be in the New York Sales Office and will cover parts of northern New Jersey.

CABOT

Frank A. Magno, Louis F. Sola and **Henry P. Donohue,** have been named to the Applied Research Section; **Willard F. Roemelt, Richard V. Does, W. Gerald Burbine,** and **William J. Casey** have been named to the Applications Research and Technical Service Section; **Joseph P. Hall** and **Robert W. Dingman** have been named to the Fundamental Research Section; and **Joel Yancey** has been named to the Organic Research Group. **Thomas E. Stretton** has been transferred to the Process Design and Economics Section. He was formerly with the Economics Department. The additions to Cabot's staff are all in the Research and Development Department in Boston.

GLIDDEN

Louis F. Long, Jr. has been appointed technical service director of the firm's central industrial region. He joined Glidden in 1947 as assistant manager of aviation sales. Mr. Long subsequently became manager of aviation sales, then assistant to the technical service director, before being appointed to his present position. A native of Macon, Georgia, Mr. Long is a graduate of the Case Institute of Technology.


Louis F. Long Jr.

WITCO

Max A. Minnig, vice president of the Rubber Chemicals Division of Witco, has been elected by the directors of the Continental Carbon Company and Continental Oil Black Company, as vice president in charge of sales for both companies. Mr. Minnig has been associated with Witco since 1946.

JOHN W. MASURY

William B. Clendening has been appointed to the board of directors. He began his career in the paint industry in 1903. Mr. Clendening joined Masury & Son, Inc., in 1922 as a salesman in Tennessee and Alabama. He is president of the Masury Paint Store, an independent business.

C. K. WILLIAMS

J. S. Googins, formerly western division sales manager at Emeryville, Calif., has been appointed general production manager at East St. Louis, Ill. He will supervise production at all company plants.

T. J. Stewart, who has been assistant production superintendent at the East St. Louis, Ill., plant, has been promoted to production superintendent there.

E. H. Green, formerly General and Eastern sales manager at Easton, Pa., is moving his headquarters to East St. Louis, Ill., where he will spend his full time as General Sales manager.

E. H. Kroepel, formerly manager of the Boston Sales Office, becomes Eastern Division sales manager at Easton, Pa.

W. N. Crumpler, formerly manager of the Detroit Sales Office, becomes Western Division sales manager at Emeryville, Calif.

R. W. Linnett, Jr., formerly territory salesman out of the Boston Sales Office, becomes manager of the Detroit Sales Office.

R. E. Hathaway, formerly territory salesman out of the Philadelphia Sales Office, becomes manager of the Boston Sales Office.

C. E. Lippincott formerly of the Eastern Sales Office, becomes territory salesman out of the Boston Office.

ROBERTSON COMPANY

Thomas M. Stokes has been elected president, replacing Ben Robertson, Jr., who resigned. Mr. Stokes was formerly vice president in charge of sales. Mr. Robertson, who founded the Robertson firm in 1939, has joined the Reliance Varnish Company as sales manager.

ANSBACHER-SIEGLE

Peter E. Davis has resigned as vice president and general manager. He joined the company in 1936. In 1947 he was promoted vice president.

SHARPLES CHEMICALS

R. H. Samis, who has been representing the company in the Detroit area, will now service all of Michigan with the exception of the Upper Peninsula. Mr. Samis has been with Sharples 26 years.

Frank K. Hoover, who left the midwestern sales force two years ago to serve as assistant to the executive vice president, will represent Sharples in Minnesota, Wisconsin, the Upper Peninsula of Michigan and the northern halves of Indiana and Illinois. Mr. Hoover has also served on the chemical engineering staff at the Wyandotte plant.

J. T. Akehurst

E. W. Schmidt

A-D-M

James T. Akehurst has been elected assistant vice president of operations. He will assume the responsibilities of **E. W. Schmidt,** vice president and general superintendent, who is taking an extended leave of absence because of illness. Mr. Akehurst was named general superintendent of ADM's oil refinery operations last April. Prior to that, he was superintendent of six refineries producing oils and fats for the firm's chemical products and foundry products divisions. Mr. Akehurst joined ADM in 1931, in the firm's Wyandotte, Michigan plant. He was made superintendent of the plant two years later and was named superintendent of the chemical products and foundry products plants in 1952. Mr. Schmidt joined ADM in 1928 when they purchased the William O. Goodrich Company of Milwaukee.

DIAMOND Alkali

Justus U. Belville has been appointed staff assistant to J. C. Forsyth, manager of specialty sales at Diamond's general headquarters in Cleveland, and Kemble S. Lewis has become assistant manager of the firm's Chicago Branch Sales, the position formerly held by Mr. Belville. Mr. Bellville joined the firm in 1941 doing merchandising and specialty sales and service work in the Pittsburgh, Pa. area. In 1950, Mr. Bellville was promoted to assistant manager of the sales office which embraces Chicago and mid-western states, a post he held until his recent appointment to Cleveland. Mr. Lewis has been with Diamond since 1947, when he joined the Chicago Branch Sales Office to do technical sales and advisory work on Diamond chemicals for the paint industry.

STANDARD-TOCH

John Condry has been appointed assistant laboratory director of the Eastern Division. He has had a wide experience in the formulation and production of industrial finishes, trade sales products and electrical insulating specialities.

AMERICAN CAN

William E. Vaughn has been named assistant to the vice president in charge of sales. He had been assistant general manager of sales for Canco since 1951. Mr. Vaughn joined Canco's Maywood, Ill., research department in 1926. He was transferred to the firm's sales department in 1935. From 1935 to 1942 he was head of Canco's sales offices at Indianapolis. After his return from government service in 1945, Mr. Vaughn was transferred to the general sales office in New York and later became assistant to the general manager of sales.

GLIDDEN

Willard C. Lighter has been named general manager of trading. He will be located at Glidden's Soya Products Division offices in Chicago. A 1933 graduate of the University of Minnesota, Mr. Lighter started his career with Cargill, Inc., of Minneapolis, in 1934. In 1948, he was elected executive vice president of Falk and Company, a division of Cargill. He held that post until his present appointment.

Ford M. Ferguson, who has been in charge of Glidden's trading operations, is retiring from the company as of January 1, 1953.

A. H. Dean

D. G. Patterson

REICHHOLD

Archie H. Dean has been appointed sales manager of the newly-formed Specialty Products Division and **Donald G. Patterson** has been named technical assistant on resins and plastics to Henry H. Reichhold, chairman of the Board. Prior to joining Reichhold, Mr. Dean was director of sales for the Barrett Division of Allied Chemical & Dye Corp. He also has been with the Eastman Kodak Company and the Hercules Powder Company. For the past 15 years, Mr. Patterson was in charge of plastics development at the research laboratories of American Cyanamid Company at Stamford, Conn. Both men will be located at 630 Fifth Ave., New York City, international headquarters of the firm.

INERTOL

James H. Ginn has been appointed sales and promotion manager. He will maintain his offices at the main Inertol plant, 480 Frelinghuysen Ave., Newark 5, New Jersey. Mr. Ginn was formerly an executive with the Devoe and Raynolds Company.

CALCO

L. A. Melsheimer, formerly in charge of the Pigment Department Technical Service Laboratory, has been appointed Manager of the Technical Promotion Pigment Department. He will supervise the preparation and distribution of technical literature relating to the application of pigments. Mr. Melscheimer has served in the paint and allied industries for thirty years in many technical capacities and as a contributor to the literature on protective and decorative coatings. He is a member of the American Chemical Society, N. Y. Paint and Varnish Production Club, A.S.T.M. and is a Fellow of the American Institute of Chemists.

L. A. Melsheimer

G-E

George M. Hartley has been appointed sales manager of the Alkyd Resin Products group. His headquarters will be in Schenectady, N. Y. Mr. Hartley has held positions with General Electric in the marketing, research, advertising and sales promotion and employee relations fields. he has also served with the firm's Chemical Materials Department in charge of the Department's Schenectady plant.

CELANESE

W. C. Goodwine has been appointed product manager of plasticizers and related chemicals for the Chemical Division. He had been in organic phosphate sales for Celanese for the past five years.

SUN CHEMICAL

Ralph C. Persons, executive vice president and director of the firm, has been named president. **George W. Ullman,** president and director of Sun Chemical, has been moved up to the chairmanship of the board. The executive changes, which were scheduled for next year, were moved up following the death of A. C. Horn, who had been chairman of the executive committee.

FALK

Samuel Aronoff has been appointed sales manager of linseed oil. He has been serving for the past two years as manager of the Eastern Sales Division with headquarters in New York City and will continue those duties in addition to his new responsibilities.

Announcing

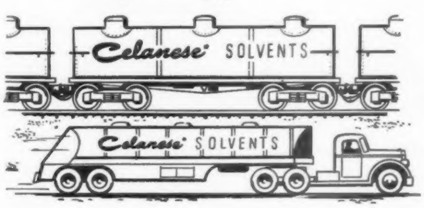
Celanese Solvents Service

A 3 Way Program To Help You Save With Celanese profit column Solvents

"LIKE MONEY IN THE BANK"

1. SAVE UP TO 17%—Talk over your solvent requirements with your Celanese representative. You will find that the Celanese Solvents cover a broad range of boiling points and evaporation rates. They are manufactured under rigid controls that assure consistent uniformity—meet the highest industry standards for performance—yet cost far less than most standard solvents.

2. COMPLETE LABORATORY AND STAFF AT YOUR SERVICE—If you are limited by space or time, experienced varnish and lacquer chemists in the fully equipped Celanese Product Evaluation Laboratories will be glad to make up trial batches, incorporating a specified Celanese Solvent in your formulation. These sample lots will be subjected to complete tests and the laboratory will also prepare production cost analyses for your information.



3. SPLIT SHIPMENT SAVINGS—For extra convenience and economy, Celanese Solvents are available in compartmented tank cars and tank-wagons for split shipments at lowest bulk prices. Overnight delivery to major industrial areas.

We would like to tell you more about Celanese *profit column* Solvents. Why not call in your Celanese representative or write: Celanese Corporation of America, Chemical Division, Dept. 558A, 180 Madison Avenue, New York 16, N. Y.

CELANESE *profit column* SOLVENTS

SOLVENT 203	SOLVENT 301
SOLVENT 601	SOLVENT 901
ACETONE	METHANOL
n-PROPANOL	ISOBUTANOL
n-PROPYL ACETATE	

Celanese* CHEMICALS

*Reg. U. S. Pat. Off.

PATENTS

Conducted by

Lancaster, Allwine & Rommel

PATENTS AND COPYRIGHTS

424 Bowen Building,
Washington, D. C.

Complete copies of any pattents or trade-mark registration reported below may be obtained by sending 50c for each copy desired to Lancaster, Allwine & Rommel.

PAINT STRIPPING COMPOSITIONS

U. S. Patent 2,614,992. Abraham Mankowich, Darlington, Md., assignor to the United States of America as represented by The Secretary of the Army.

A paint stripping composition comprising from about 2.5 to 10 per cent by weight of dodecyl diethylene triamine and up to 15 per cent by weight of a non-ionic alkylated aryl polyethylene glycol ether surface active agent the remainder of said composition consisting essentially of a mixture consisting of a major proportion of trisodium phosphate and the balance being sodium trisilicate.

MIXED TRIGLYCERIDES

U. S. Patent 2,615,160. Frederic J. Bauer Wyoming, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio, a corporation of Ohio.

A fatty composition consisting essentially of diacetyl triglycerides, the non-acetyl, acyl radicals of which are those of a fatty acid of 12 to 22 carbon atoms each 100 parts of the said mixture containing from about 10 to about 90 parts by weight of diacetyl triglycerides selected from the group consisting of symmetrical and unsymmetrical diacetyl triglycerides and inversely from about 90 to about 10 parts by weight of triglycerides selected from the group consisting of, (*a*) diacetyl triglycerides differing from the aforementioned diacetyl triglycerides only in isomeric form, (*b*) diacetyl triglycerides differing only in chain length of the high molecular fatty acid acyl radical from the said aforementioned diacetyl triglycerides being substantially free of triacetin and of triglycerides solely of high molecular fatty acids and being in waxy translucent form of great stability.

Drying Oil Composition

U.S. Patent 2,616,863. Herman S. Bllch, Chicago, and Edward M. Geiser, Downers Grove, Ill., assignors to Universal Oil Products Company, Chicago, Ill., a corporation of Delaware.

A drying oil composition consisting essentially of from about 5 to about 25 per cent of a styrenated unsaturated fatty acid ester drying oil containing from about 5 to about 50 per cent by weight of styrene, and from about 75 to about 95 per cent by weight of a mixture of unsaturated conjunct polymer hydrocarbons boiling between about 150° to about 450° C., said polymers comprising a mixture of polyolefinic, cyclic hydrocarbons containing conjugated as well as non-conjugated unsaturation, having a bromine number above about 140 and a maleic anhydride value of from about 30 to about 90, the individual hydrocarbon components of which have an average of from about 2.5 to about 4 double bonds per molecule, from about 40 to about 70 per cent of which are in conjugated relationship to each other.

Coating Composition

U.S. Patent 2,617,776. Paul E. Marling, Dayton, Ohio, assignor to Monsanto Chemical Company, St. Louis, Mo., a corporation of Delaware.

A coating composition comprising (A) 25 to 90 percent by weight of a copolymer of an alkyd resin having an acid number from 0 to 20, said alkyd resin being a condensation product of a drying oil fatty acid, an aliphatic polyhydroxy alcohol and a polycarboxylic acid; and a monomer of the group consisting of styrene, vinylbiphenyl, isopropenylbiphenyl and αmethylstyrene, and (B) 10 to 75 percent by weight vinyl esters of tall oil.

Calking Compounds

U.S. Patent 2,618,569. Kenneth Louton, Des Plaines, Ill.

A calking compound adapted to seal joints, cracks and seams between wood, brick, concrete and metal, and combinations of such materials, and which is capable of neutralizing the alkali on such materials and/or microscopically etching such materials comprising the following ingredients in approximately the stated proportions: 55½% pigment including 10% fibrous asbestos binder, 36% inorganic filler, 9% titanium-calcium, and ½% cobalt dryer; 33% nonvolatile vehicle including 32% of an oil selected from the class consisting of a vegetable drying and a glyceride semidrying oils, ½% calcium linoleate, and ½% of 70% chlorinated paraffine; and 11½% volatile vehicle including 10% oleum spirits, and one-tenth of 1% to 2% of 55% acetic acid.

Paint Remover

U.S. Patent 2,619,468. Fritz Zumbrunnen, Zurich, Switzerland.

A paint remover characterised by the following composition:

I. A solvent mixture containing the following constituents:

	Percent by weight
Acetone	between 20.5 and 30.3
Methylacetate	between 15.4 and 24.2
Trichlorethylene	between 10.2 and 18.2
1,2-dichlorethane	between 12.8 and 21.2
Mesityloxide	between 20.5 and 30.3

II. 4-5% of cellulose nitrate based on the weight of the solvent mixture I.

III. 5-6% of paraffin and 8-10% Turkey red oil based on the weight of the combined mixtures I and II, and

IV. 5-15% of starch in 15-25% of water based on the total weight of the combined mixtures I, II and III and containing a sufficient amount of a 50% NaOH solution to make the starch-water mixture viscous.

Pigment Coloring Compositions

U.S. Patent 2,616,861. George F. Jones, Glens Falls, N.Y., assignor to Imperial Paper and Color Corporation, Glens Falls, N.Y., a corporation of New York.

A pigment paste which comprises a dispersed pigment, a cationic resin and water, said resin being the product prepared by reacting together in the presence of heat and agitation melamine, formaldehyde, glycerine, and an alkylol amine in the proportion of 1 mol of melamine at least 7½ mols of formaldehyde, 1 to 4 mols of glycerine, and from 1 to 3 mols of an alkylol amine until a homogeneous clear solution is obtained, acidifying the resultant product to a pH of from 0.5 to 2.0, and then neutralizing the product to a pH of from 6 to 7.

1952 DEVELOPMENTS

(*From page 32*)

on the basis of their unsaturation. The more unsaturated fractions possess improved drying properties whereas the more saturated fractions are valuable in soap, edible oils, and other non-paint products. Scott et al (332) determined boiling points of methyl esters of even-numbered C_8 to C_{18} acids at low pressures. The purity of each saturated ester, together with the freezing points of the pure compounds, was calculated from freezing point curves. The data obtained indicate that methyl esters of successive even-numbered fat acids are readily separable by distillation, but that methyl esters of C_{18} unsaturated acids cannot be produced in pure state by distillation equipment available at this time.

5.9.9. Clark and Wamble (291) describe the equipment and the method of measuring the rate of extraction of oil from oil bearing materials by solvent. The method consists essentially of immersing wire baskets containing the oil-bearing material in a circulating stream of solvent for varying periods of time. After extraction, the baskets are centrifuged to remove excess solvent, and the residual oil in the solids is determined. Eaves et al (294) compared hexane, benzene, ethyl-ether, acetone, and butanone for their effect on yield, composition, properties and processing characteristics of the meals and curde oils produced. The solvents which were more polar and in which water was more soluble yielded crude oils which were correspondingly higher in non-oil content. None of the experimental solvents compared favorably with hexane as extractants for cottonseed.

5.9.10. Stansbury and Hoffpauir (290) offer a ready means of approximating the fatty acid composition of cottonseed oils from their iodine values by demonstrating that the increase in linoleic and in the decrease in oleic and saturated acids result in a corresponding increase in iodine value.

Waxes

Business and Economic

6.1.1. Montan wax imports (481) from Germany which averaged 5,000-6,000 tons a year before the war are now down to 900 tons. Humacid Co. and American Lignite Products are able to produce 5 tons of montan per day from domestic sources of lignite. A new extraction process was developed to control the resin content of the wax. After a first extraction with a highly aromatic solvent, the wax is redissolved in a light petroleum cut virtually free of aromatics. The secondary extraction provides preferential solubility for different types of waxes, different concentrations of asphalts and resins.

6.1.2. The market for oxidized microcrystalline waxes brings in another producer, Bareco Oil, to join Warwick Chemical and Petrolite. (485) Main use for waxes is in emulsion polishes. They're cheap, easily emulsified, offer stable supply from domestic sources, improve polish characteristics.

Commercial Products

6.2.1. Acrawax C, a synthetic wax with the very high melting point of 140-142 C. has been improved in color stability toward heat. A light tan, hard wax, supplied in atomized, powdered and coarse ground and solid forms. Uses: insulating wax, mold release agent, lubricant, detackifier, increase moisture and salt-spray resistance; water-repellant, anti-static agent. GLYCO PRODUCTS CO. Wax Ester No. 60, petroleum derivative is used in the manufacture of greases, plasticizers, wetting agents and synthetic resins. PETROLITE CORP.

6.2.2. Parwax, a carnauba substitute, is similar to carnauba wax in many physical and chemical characteristics. Gloss readings are considerably higher. Domestic wax known as Concord Wax No. 407 is claimed to successfully replace imported carnauba at a fraction of the cost and makes possible the production of a dependable water-wax emulsion that are translucent, light in color, stable, with good gloss and excellent durability. CONCORD CHEMICAL CO.

6.2.3. Emery A-805-R is a hard odorless waxy solid. Solubility in in solvents increases with rise in temperature and forms a gel upon cooling. Its wax-like character and compatibility with other waxes shows promise for polishes, carbon paper, paper coating, textile auxiliaries, etc. Acid Value 3.0; Melting Point 81 C; Hardness (Shore Durometer B) 65; Flashpoint 480 F; Fire point 535 F; Color, Solid Light Tan. Emery C-842-R Stearone, is a white crystalline solid, 75 C melting point, insoluble in water, slightly soluble in hot alcohol or ether. Useful as wax extender. EMERY INDUSTRIES, INC.

Products Developed

6.3.1. Fish (29) obtains a wax capable of forming stable water emulsions and drying to a glossy film by treating a hydro-carbon wax to oxygen in presence of an oxidation catalyst, chlorinated paraffin and a drying oil. Fish (30) also obtains a wax of high emulsion stability and high gloss films by subjecting a hydro-carbon wax to oxygen in the presence of a polymerized lower alkylene hydrocarbon, a chlorinated paraffin, an oxidation catalyst and a drying oil. Sesso and Jordan (104) have an aqueous wax composition containing a wax, a monohydroxy aliphatic alcohol water and an emulsifying agent.

6.3.2. Larsen and Schaerer (7) have developed a method of blending wax and polyethylene by taking equal parts of a wax and polyethylene and blending at a temp. above the melting point of the wax. After a blend is obtained, additional melted wax is added to obtain a homogeneous wax composition. Schneider (40) obtains a polyethylene wax from polyethylene in a chlorinated wax of 2 to 8% chlorine. Lovell (8) obtains a yellowish brown wax, melting point 216 F, S. G. 0.9307, soluble in hot hydrocarbon solvents, by heating molten polyethylene and a microcrystalline petroleum wax.

6.3.3. Young and Morway (36) make a wax composition from refined paraffin wax and a metal salt of an alkali metal and a heterocyclic carboxylic acid. Butler (53) developed a wax coating composition from a hydrocarbon wax and an alkylated polystyrene. Turinsky (127) prepares an amidoester wax by condensing a saturated monobasic fatty acid with a mono or dialkanolamine which is then reacted with an aliphatic dibasic acid.

6.3.4. Fischer (10) determines the oil content of waxes by addition of a oil soluble dye stuff to the wax, solidifying the wax and measuring the collor change of the dye.

Technical Developments

6.4.1. Greenlee and Kraatz (234) describe the various natural and synthetic waxes and how they are formulated into emulsions, and solvent dispersions. Uses in food processing metal coatings, wood coatings and special applications are described in detail.

6.4.2. Ruggeri (223) describes the types and methods of testing of solventless wax-resin impregnants used for the protection of electrical and electronic equipment.

6.4.3. Synthetic Waxes by Glyco is a 16 page catalog with tables of specifications for synthetic waxes including amide and ester types that range in melting points from 55 C to 143 C and in hardness from soft, plastic to hard and brittle. They are generally light in color, white to tan. Some are insoluble in water and others are dispersible in water. Many are insoluble in solvents except at their melting points. They are compatible with natural and synthetic waxes and resins. GLYCO PRODUCTS CO., INC.

Whichever way you go—

For alkyd flats: U.S.I. pioneered with Aroflat* 3010, which was the first pure alkyd specifically designed as the sole vehicle for flat wall finishes. This was followed by Aroflat* 3025, the first pure alkyd for use as the sole vehicle in self-sealing wall paints. Then came Aroflat* 3050, which met the demand for more economical alkyd flat paints of good quality. *All three U.S.I. Aroflat alkyds are available in either odorless or regular solvents to fit your requirements.*

For latex paints: U.S.I. experience and research with alkyd emulsions led to the development of the first alkyd specifically designed for latex paints—Aroplaz* 1274—which overcomes the tendency of pure latex toward poor adhesion and wet scrubability. At the same time, Aroplaz* 1274 contributes better color retention, greater freeze-thaw stability and greater latitude of pigmentation—all without increase in raw material cost of latex paint. Aroplaz 1274 is available in both odorless and regular solvents.

Whichever way you go—alkyd flats or latex paints—odorless or regular solvents—tank cars or drums—call or write your nearest U.S.I. office for AROFLAT alkyds or AROPLAZ 1274.

**Reg. U.S. Pat. Off.*

U.S.I. INDUSTRIAL CHEMICALS CO.

Division of National Distillers Products Corporation
120 Broadway, New York 5, N. Y.
Offices in Principal Cities

TECHNICAL *Bulletins*

WAX POLISH ODORS

A series of odors for use in various types of waxes and polishes is described by Sindar Corp., 330 W. 42nd St., New York 36, N.Y. in its technical Bulletin S-1, "Wax and Polish Odors".

The bulletin states that the odors listed are the result of extensive research and consumer panel tests aimed at increasing sales.

The bulletin offers odors for floor waxes, furniture polish and metal polishes, and gives concentrations effective in the various types covered. A short description of the wax and polish odors is also given.

LINSTYROL

Nine-page booklet discusses the uses of Linstyrol, a styrenated linseed oil available at 100 percent solids. Specifications and compatibility of this oil are included together with a detailed discussion of the use of this styrenated oil in the manufacture of glycerol alkyds and PE alkyds. Processing data and information for synthesizing the various alkyds are also given. Spencer Kellogg and Sons, Inc., Buffalo 5, N. Y.

RESIN DATA SHEETS

Technical data sheets describe Rezyl resins 406-22 and 874-22 (two alkyds for odorless interior and architectural finishes) and Beetle Resin 220-8 (urea resin for baking enamels of faster curing speed and better chemical resistance). American Cyanamid Co., Plastics and Resins Div., 30 Rockefeller Plaza, New York 20, N. Y.

VINYLS

Sixteen-page booklet contains information and uses of modified vinyl chloride acetate copolymers. Such important factors as chemical composition, solubility, compatibility plasticization, pigmentation, softening point, physical and chemical properties are discussed. Suggested formulation for application of this resin in metal finishes, container coatings, adhesives, paper coatings, etc. are presented. Bakelite Co., Div. of Union Carbide and Carbon Corp., 300 Madison Ave., New York, N. Y.

RESIN DISPERSIONS

Compounding data on aqueous dispersions of polystyrene are discussed in this sixteen-page bulletin. Description of the various systems are presented together with sections dealing with compounding, plasticizer and waxes, pigmentation, thickening agents, anti-block, and foam depressants. Monsanto Chemical Co., Springfield 2, Mass.

THICKNESS GAGE

Operation and use of portable gage for measuring thickness of non-magnetic coatings on magnetic bases are described in this six page folder. According to the manufacturer, this instrument can reveal the presence of pin-holes and scratches in non-conductive coatings on conductive bases. One important use of the gage is in the examination of corrosion-protective coatings for thickness and film continuity. Branson Instrument, Inc., 430 Fairfield Ave., Stamford, Conn.

MIXING EQUIPMENT

Various mixing units are described and illustrated in this 12-page bulletin. Application and operation are described for each type of apparatus. Six types of turbine mixers and nine models of mixer drive heads are discussed. International Engineering, Inc., Dayton, Ohio.

FATTY ACIDS FOR EPOXY COATINGS

Technical bulletin describes use of dehydrated castor oil fatty acids as applied to the modification of the new epoxy resins for better results in baking finishes. This bulletin gives full data resulting from tests on baking speed, flexibility, abrasion, chemical resistance and impact. Copies are available through Baker Castor Oil Company, 120 Broadway, New York 5, N. Y. Ask for Technical Bulletin #27.

DIBUTYL ADIPATE

The plasticizing applications of dibutyl adipate and its ability to impart low-temperature flexibility and water resistance are discussed in this report. It is particularly effective when used in polyvinyl chloride, polyvinyl chloride acetate, ethyl cellulose, cellulose nitrate, polystyrene and synthetic rubbers.

For a copy of Technical Service Report E-5, write to Witco Chemical Company, 295 Madison Avenue, New York 17, New York.

TOLUENESULFONIC ACID

Physical properties and chemical behavior of p-toluenesulfonic acid as a catalyst and other uses are presented in 2-page bulletin issued by Smith-New York Co., Inc., Freeport, Long Island.

PIGMENT USES

Four page brochure gives technical data covering line of carbon blacks, bone blacks, black dispersions (base and aqueous), and iron oxide colors for use in rubber, paints, inks, plastics and emulsions. Data is presented in tabular form. Binney & Smith Co., 41 E. 42nd St., New York 17, N. Y.

FLAT WALL VEHICLES

Booklet entitled "Falk Talk On Oils" and "Resins for Flat Wall Finishes" has been published by the Falk Division of Cargill, Inc., P. O. Box 1075, Pittsburgh 30, Pa. Booklet discusses the formulation of flat wall finishes, plus heat bodied and gelled oils, limed or calci-coater oils, alkyd resins, and other non-oil types of binders for flat wall paints. Copy may be had by writing the company.

SAFFLOWER OIL

Complete and detailed study on the characteristics of safflower oil is offered this month by the Pacific Vegetable Oil Corp., 62 Townsend St., San Francisco, Calif. The new 35-page booklet deals with safflower oil's properties and applications in protective coatings. Illustrated with charts and tables, the study gives comparative figures on safflower and related oils, details on drying characteristics, heat polymerization and other properties. It deals with blown oil, limed oil and maleated oils, as well as safflower oil's applications in varnishes and alkyds.

BRUSH ALODINE

Six-page folder presents information and use of Brush "Alodine" for protecting aluminum products. Chemicals and equipment required for the process are given together with facts and advantages of the Brush Alodizing process. American Chemical Paint Co., Ambler, Pa.

STEARATES

Technical service bulletin describing their complete line of stearates is now available from the Witco Chemical Co., 295 Madison Ave., New York 17, N. Y. The characteristics of the compounds and their application in various industries are covered both generally and specifically. Also included in the bulletin are: government specifications of metallic sterates as to grade, specification number and uses; analytical tests used; a guide to Witco's other products and the industrise using them, and a list of technical reports relating to stearates and special soaps. For copies of bulletin 53-1 write to the company.

LATEX PAINTS

Compilation of formulations for latex paints containing mica is presented in this six-page folder issued by the Wet Ground Mica Association, Inc., 420 Lexington Ave., New York 17, N. Y.

LATEXES

Bulletin discusses the formulation of latex paints with the various latexes offered by the company. Properties of the latexes and suggested latex combinations are presented. Such important factors covered are pigmentation, plasticization, preservatives, thickeners, pH adjustment, manufacturing procedure, containers, and labeling. Dow Chemical Co., Plastics Dept., Midland, Mich.

FLAT WALL VEHICLES

Data sheets discuss flat wall vehicles both the alkyd and latex types.

Information on Aroflat line (alkyd) for use in self sealing flats, flat wall finishes, eggshell wall finishes, semi-gloss finishes, odorless wall finishes, wall primers and undercoaters.

Data on Aroplaz 1274, long oil, oxidizing alkyd for fortifying latex paints is also included. U. S. Industrial Chemicals Co., Div. of National Distillers Products Corp. 120 Broadway, New York 5, N.Y.

MAINTENANCE COSTS

R. S. Aries & Associates, 400 Madison Ave., New York 17, N.Y., consulting firm of chemical engineers and economists, has released a brochure entitled "The Problem of Maintenance Costs" by Mr. Jackson D. Leonard, senior associate of the Aries firm. Mr. Leonard is a specialist in cost reduction programs, and this new pamphlet discusses the profits lost through poor and inefficient maintenance practices, and what companies can do to improve performance in this department. Mr. Leonard's work represents a modern approach to reduction of maintenance costs for the chemical process industries. This brochure is available free upon request.

WIRE CLOTH CATALOG

121-page catalog contains specifications and uses of wire cloth and filter cloth. Data required in designing process units which contain wire cloth and filter cloth are also included. A highlight of section IV is a report on 18 months of research into the flow characteristics and particle retentivity of metallic filter cloths conducted at Columbia University in New York. Multi-Metal Wire Cloth Co., Inc., 1350 Garrison Ave., New York 59, N. Y.

RAW MATERIALS

(From page 41)

of petroleum. With regard to aromatics (toluene and xylene), it seems likely that the supply of these solvents will be tight due to the demand for toluene for aviation gasoline and explosives. This is expected to continue until the spring of 1953 when new supplies will become available.

Odorless Solvents — Interest and demand in this new solvent has increased sharply during the year. In recent months, there have been a number of new suppliers, which should help to meet all demands.

RESINS

Cellulosics — Nitrocellulose, carboxmethylcellulose, ethyl cellulose and cellulose acetate are in very good supply.

Chlorinated Products — Both chlorinated rubber and chlorinated paraffin are in ample supply.

Synthetic Resins — Generally speaking, the synthetic resin supply picture is bright. There are no shortages of raw materials or government controls to hamper adequate production of these resins. However, paraphenylphenol resins are in tight supply at the present time.

Rubber Latices and Resins — Greater quantities of these resins will be available through expansion and entry of new suppliers. These stocks should meet existing and new demands. It is expected that the sale of latex paints should reach about 45 million gallons in 1953.

IMPORTANT CHEMICALS

Glycerine — Although current supplies of glycerine are below 40 million pounds, it is felt that the availability of glycerine for alkyd manufacture during 1953 will be adequate because of an expected increased synthetic glycerine production along with increased production of fatty acids and alcohols in which glycerine is a by-product. Weak level of soap production and a long strike were the primary factors which caused short supply of this important chemical.

Phthalic Anhydride — Current producers of phthalic anhydride are now substantially increasing their plant capacity and this added production should become available in the spring of 1953. The supply situation is good and will take care of all normal requirements.

NAVAL STORES

Rosin — There has been a downward trend in the demand of rosin and consumers have allowed their own inventories to shrink below the margin of comfort. Also, production of naval stores has been steadily downward. It is estimated that by March 1953, deficiency will be about 325,000 drums and if this trend continues, it could create a serious supply situation.

CANS AND DRUMS

The steel strike naturally has caused some dislocation but this is steadily being eliminated by additional tin mill production so that restrictions on metal containers should be removed by the first quarter of 1953.

The tin situation is not bright, but it is expected that increased imports from Boliva will ease the situation considerably. A spokesman from the container industry is of the opinion that 1953 will see unlimited use of metal containers for the paint industry.

According to the Association, steel drums and pails should be easier in the first quarter of 1953 and in full supply during the second quarter.

•

Chicago RR Pre-Heating Paint Before Spraying Their Cars

An experiment in painting railroad cars, both passenger and freight, is being tried by the Chicago & Easton Illinois Railroad at its Danville, Ill., shops with good results, according to George E. Bennett, superintendent of motive power.

The experiment, started several months ago, is called the "Hot Paint Method" and was adapted from the experience of automobile builders.

The new painting method involves the preheating of paint so that it reaches the spray nozzle at about 140 degrees Fahrenheit. This is done by immersing the tanks of paint in electrically heated hot water tanks.

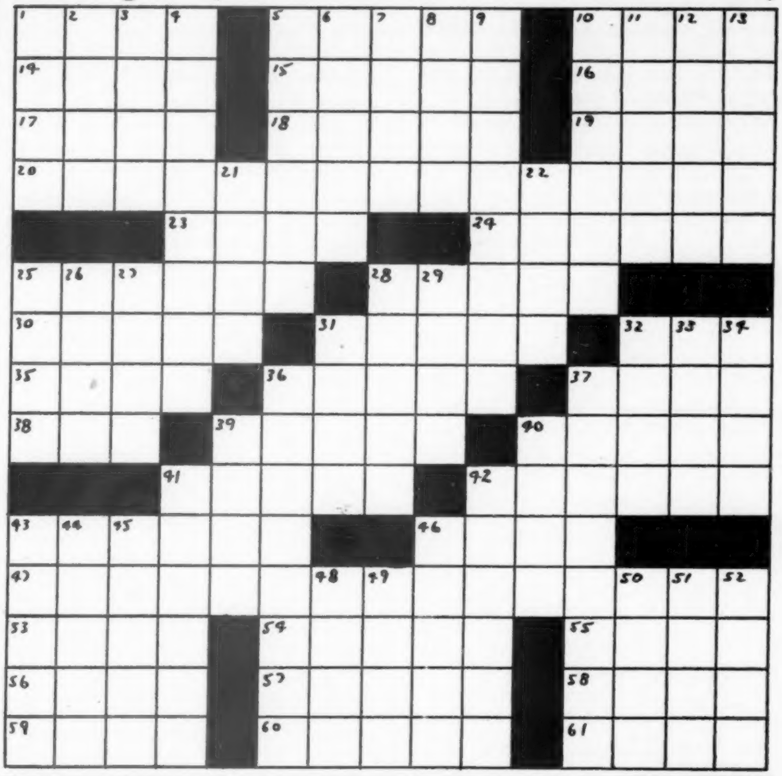
According to Mr. Bennett, the new method of painting cuts costs considerably and reduces spray dust to the vanishing point.

He said that "Heretofore wind-borne spray dust, when painting outdoors, extended for a three-quarter miles radius.

Although Pullman-Standard began experimenting with the "Hot Paint Method" several months ago, it has only been recently that it has been applied to passenger cars, Mr. Bennett added.

PVP CROSSWORD PUZZLE

Featuring Many Terms Common to the Paint Industry



ACROSS

1. ---'- that?
5. African tree
10. Los Angeles product
14. western state
15. ----- of aces
16. ----ight (battery)
17. canal
18. one less than nature
19. A----na, Pa.
20. reverse of the coming together of suspended particles and adhering to each other (plural)
23. ----er, used for belts
24. thermal shock tests call for temperature ------.
25. lances
28. yellow pigment
30. smart ----- (plural)
31. latest form of home movies
32. sweet as apple cider
35. 5 ----, common paint container
36. gram-molecular weight
37. nearly circular
38. affirmative votes
39. adores
40. avoid
41. boat mover
42. phenolic resin
43. dancer
46. European industrial area
47. protection against tropical deterioration
53. Eskimo hut
54. raw material for resin used in enamels (plural)
55. single time
56. filler
57. depart
58. Association of Electrical Manufacturers
59. suffix for native (plural)
60. lessens
61. section of U.S.

DOWN

1. colored
2. N---- Dame
3. wanderer
4. wood sealers and coatings
5. money exchangers (Italian)
6. agreement (2 words)
7. natural gum
8. ----ine (passenger carrier)
9. promise breaker
10. join
11. photographic developer
12. marking for single package
13. luster of dried film
21. poetic contractions
22. novice
25. tale
26. undesired distance between a bearing and axle
27. alternate source of electricity (plural)
28. one who keeps mills and mixers running smoothly
29. civilian defense agencies
31. select
32. ---- the Terrible
33. baby talk
34. single 30 across
36. paint structural unit
37. color of thick pigmented film
39. ----ion of Canada
41. toasters
42. ------ through roller mill
43. mushroom stem
44. type of camera
45. relax in lazy manner (var)
46. sieve (var)
48. vicinity
49. meadows
50. ----rth (inter)
52. trim

SOLUTION ON PAGE 72

Material Handling Education Committee Holds Fall Meeting

The College-Industry Committee on Material Handling Education, organized to better equip engineering students for the material handling field held its Fall Meeting recently.

Professor S. A. Larsen, director of the Materials Handling Center of Wayne University in Detroit, was appointed permanent chairman of the Committee, and Professor W. Van Allen Clark, Jr. of the Massachusetts Institute of Technology's School of Industrial Management, was named permanent vice chairman.

Under the direction of the new appointees, proposed objectives were revised and adopted. Among the aims of the Committee are: to increase educational facilities in material handling courses, to develop new teaching aids not presently available for use in such courses, to encourage material handling research and to determine qualifications required by Industry and Education of the value and nature of material handling.

Other college representatives serving on the Committee are: H. T. Amrine, associate professor and chairman of the Industrial Engineering Department of Purdue University, Lafayette, Ind.; J. M. Apple, associate professor of Industrial Engineering, Michigan State College, Lansing, Mich.; ad F. E. Winter, associate professor of Industrial Engineering, Columbia University, New York.

Permanent appointees selected to various organizational sub-committees are: Irving M. Footlik, materials handling consultant, retained as secretary of the Committee; D. H. Bitney, vice president of the Union Steel Products Company, Albion, Mich., chairman of the finance sub-committee, and J. H. Wunsch of the Silent Hoist & Crane Company, Brooklyn, New York, chairman of the budget sub-committee.

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Plaskon Coating Resin Sales Area to Include St. Louis

Donald Delaney, coating resin sales manager for the Plaskon Division, Libbey-Owens-Ford Glass Company, has announced the extension of the Division's coating resin sales territory to include the St. Louis area.

Plaskon sales representatives serving the area are T. O. Woldt and Wilbur R. Wood. They will operate out of Plaskon's Chicago office located at 120 South LaSalle St., Chicago 3, Ill.

The Plaskon Division's coating resin department manufacturers and sells a variety of resins used in the manufacture of paints and varnishes.

ALUMINUM VS —

(*From page 40*)

(6) Aluminum silicates (kaolins) of the water-washed, water-fractionated type are particularly suited for high efficiency Flow Point grinding formulas.

References

(1) Southern Research Institute, Project No. 316, Progress Reports Nos. 1, 3, 4 and 5, dated May 7, August 20, October 9, and November 14, 1951, respectively "Evaluation of Edgar Brothers Company Clays as Inerts for Government Specification Coatings", (Private communications)

(2) Reichhold Chemical Co., suggested formulas for Military Specification MIL-P-6889A, Primer; Zinc-Chromate for Aircraft Use, Type I, June 18, 1951.

(3) Kentucky Color & Chemical Co., Shawnee Wigwam, August, 1951, p. 1-5, "Data on the Manufacture of Zinc Chromate Primer, MIL-P-6889A".

(4) E. I. DuPont de Nemours & Co., Pigments Dept., Technical Service, Bulletin No. 18, "Military Specification MIL-P-6889A —", January 4, 1952.

(5) Military Specification MIL-P-6889A, October 30, 1950, "Primer; Zinc-Chromate, for Aircraft Use".

(6) Frederick K. Daniel, Circular 744, Scientific Section, National Paint ,Varnish & Lacquer Assn., October, 1950, "A System for Determining the Optimum Grinding Compositions of Paints in Ball and Pebble Mills."

(7) R. B. Shurts, Circular 745, Scientific Section' National Paint, Varnish & Lacquer Assn., October, 1950, "The Determination of Proper Paint Grinding Formulations for Ball and Pebble Mills."

(8) Federal Specification TT-P-141b, Method 428.1 "Viscosity (or consistency) of Pigmented Products — Krebs-Stormer Viscosimeter".

(9) D. Doubleday and A. Barkman, Paint, Oil & Chemical Review, June 22, 1950, "Reading the Hegman Grind Gauge".

(10) F. H. Norton and S. Speil, Journal American Ceramic Society, 21 (3) 89-97, March, 1938, "The Measurement of Particle Sized Clays".

(11) Method adopted by the Federal Specification Board and American Society for Testing Materials, Designation D281-31.

(12) Gardner's "Physical and Chemical Examination of Paints, Varnishes, Lacquers and Colors".

(13) W. R. Eubank, Edgar Brothers Company Report, October 23, 1951, "Oil Adsorption Studies on Edgar Clays and Other Inert Pigments".

Large Paint Consumer Market In Chicago Area, Survey Shows

Development of a rapidly expanding consumer market for paint in the Chicago Metropolitan area has been disclosed in a Chicago Tribune paint purchases analysis.

A Tribune consumer panel reported that 46.9 per cent of the families in the area bought paint during 1951. Projected to the market this represents 750,400 families.

As the painters' wage scale goes up, more families are doing their own painting, the Tribune report said.

In Chicago, the painters' current hourly scale is $2.60, second only to that in New York.

The Tribune research shows that so far no single paint manufacturer has taken a dominant position in this expanding market. The leading firm in dollar volume handled 11.3 per cent of the business during the last six months of 1951, the second place brand received 8.5 per cent. and the third place firm took 5.3 per cent.

An all-year market for paint also is reflected in the consumer panel reports, with an emphasis on exterior painting in the summer, interior painting in winter.

A purchase survey during the second half of 1951 showed that 40.3 per cent were made from paint stores, 21.8 per cent from the four biggest house brand retailers, 24.3 per cent from hardware stores, and 8.1 per cent from department stores.

CALENDAR OF EVENTS

Jan. 19-22. Plant Maintenance Conference and Show, Public Auditorium, Cleveland, Ohio.

Jan. 27-29. 26th Annual Convention of Ass'n. of American Soap and Glycerine Producers, Waldorf-Astoria, New York, N.Y.

Mar. 18-21. 17th Annual Convention of the Southern Paint and Varnish Production Club, Buena Vista Hotel, Biloxi, Miss.

Production Club Meetings

Baltimore, 2nd Friday, Park Plaza Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
- Cincinnati — Oct., Dec., Mar., May, Hotel Alms.
- Dayton — Nov., Feb., April, Suttmillers.
- Indianapolis — Sept., Claypoll Hotel.
- Columbus — Jan., June, Fort Hayes Hotel.

Cleveland, 3rd Friday, Harvey Restaurant.

Dallas, 2nd Thursday, No Fixed Place.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, Last Monday, El Jardin Restaurant, San Francisco.

Houston, 2nd Tuesday, Seven Seas Restaurant.

Kansas City, 2nd Wednesday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, Puritan Hotel, Boston.

New York, 1st Thursday, Building Trades Employers Assn.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, Annual Meetings only.

Philadelphia, 3rd Wednesday, Engineer's Club.

Pittsburgh, 1st Monday, Fort Pitt Hotel.

St. Louis, 3rd Tuesday, Forest Park Hotel.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Diana Sweets, Ltd.

Western New York, 1st Monday, 40-8 Club, Buffalo.

New Books

ASTM Standards on Paint

Published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Price $5.75.

The eighth edition (September 1952) of the compilation of ASTM Standards on Paint, Varnish, Lacquer and Related Products provides in convenient and up to date form each of the more than 200 specifications, tests, and definitions issued by the American Society for Testing Materials through work of its Committee D-1. Also included are related standards from other committees. Committee D-1 comprising prominent authorities representing consumers, producers, and general interests, has sponsored seven previous editions of this volume, the last being in 1949.

Material covers standard specifications for: pigments (white, black, blue, metallic, etc.); drying oils, paint driers, and thinners; shellac, varnish, and varnish materials; naval stores; lacquer and lacquer materials; traffic paint, bituminous emulsions; paint tests, putty, and paint weathering tests.

This new edition embodies numerous revisions of existing specifications and tests, and much new material prepared since the previous edition. There are 23 new standards included: 16 are methods of test, 6 are specifications, and one covers forms for reporting results of exposure tests for paint.

New methods of test cover: tests for resin oils; heptane number, Kauri Butanol value, and nitrocellulose diluting power of hydrocarbon solvents; purity of acetone and methyl ethyl ketone; total chlorine in polyvinyl chloride polymers and copolymers used for surface coatings; solvent tolerance of amine resins; viscosity of paints, varnishes, and lacquers by Ford viscosity cup; common properties of certain pigments; color of clear liquids (platinum-cobalt scale); fineness of dispersion of pigment-vehicle systems; temperature-change resistance of clear nitrocellulose lacquer films applied to wood; roundness, crushing resistance, and sieve analysis of glass spheres; rosin acids in fatty acids.

New specifications include: methanol (methyl alcohol); methyl isobutyl ketone; asphalt-base emulsions for use as protective coatings for metal; and calcium carbonate pigments.

New methods of measurement include: measurement of dry film thickness of non-magnetic coatings of paint, varnish, lacquer and related products applied on a magnetic base; and measurement of wet film thickness of paint, varnish, lacquer, and related products.

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SOLUTION TO PVP CROSS WORD PUZZLE ON PAGE 69

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